MINING WORLD

in this issue

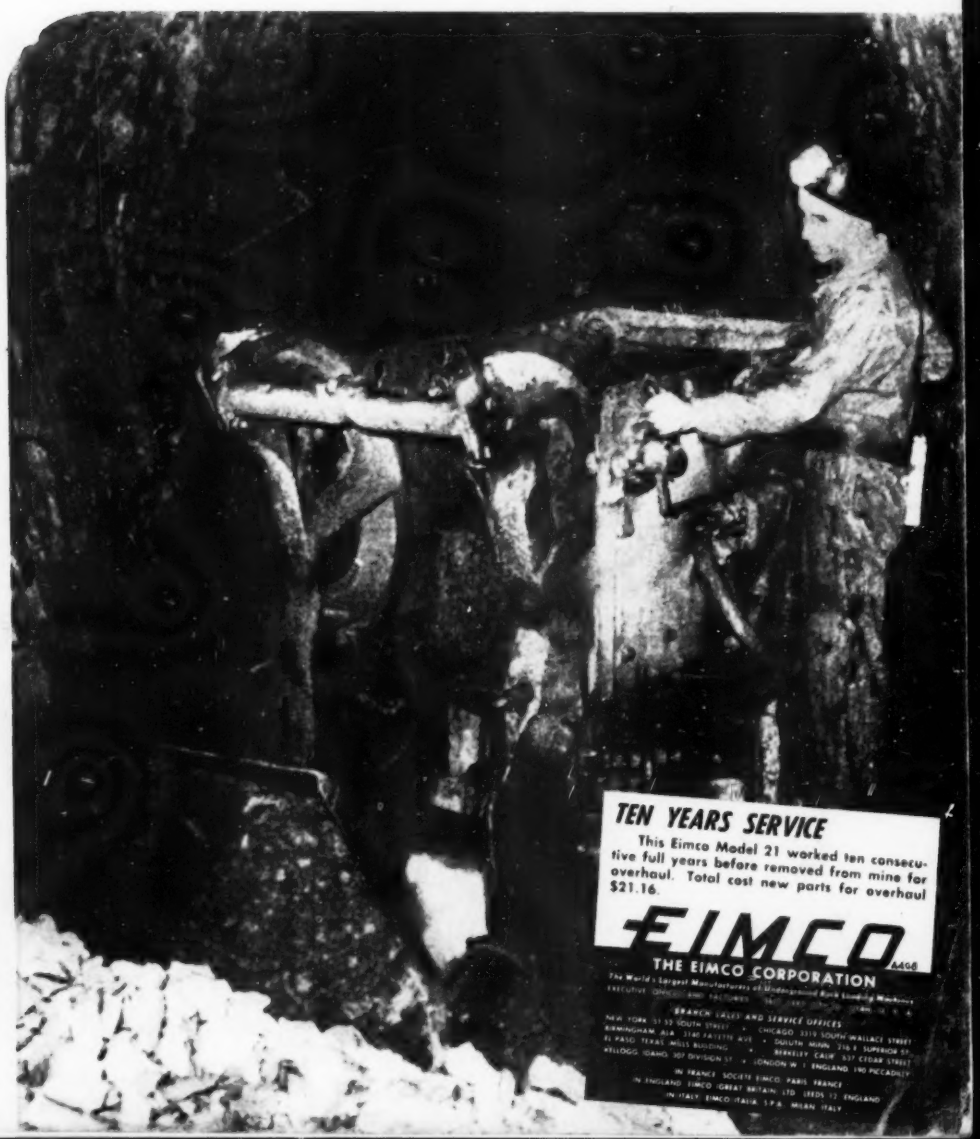
Tin Mining in the Congo

Page 32

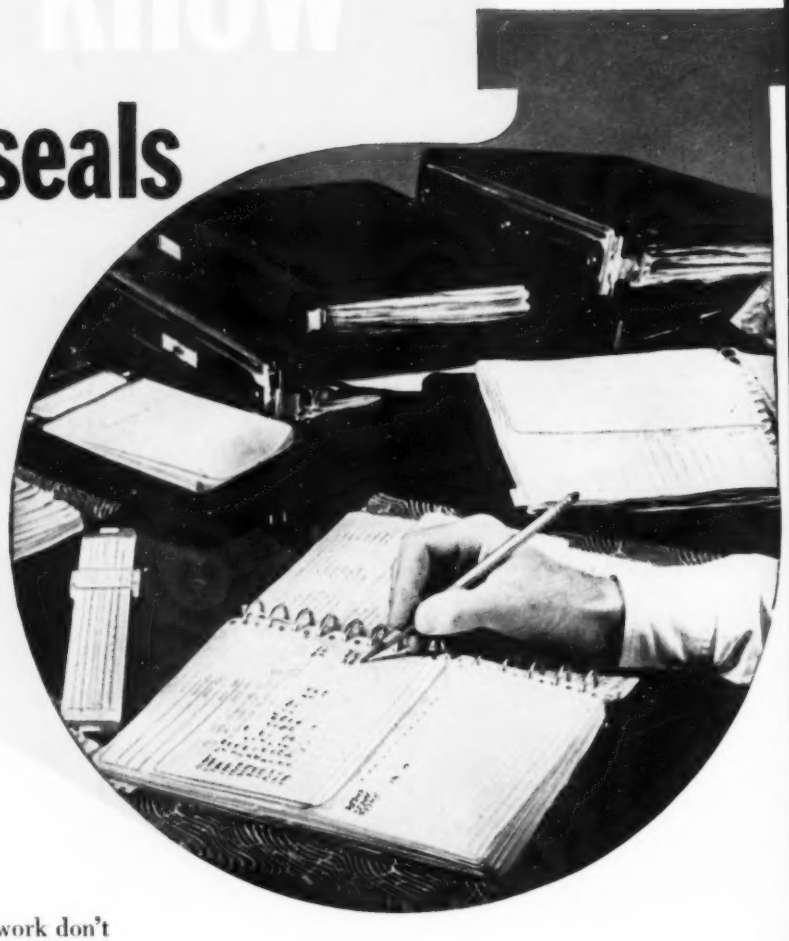
NOVEMBER, 1952

Vol. 14 No. 12

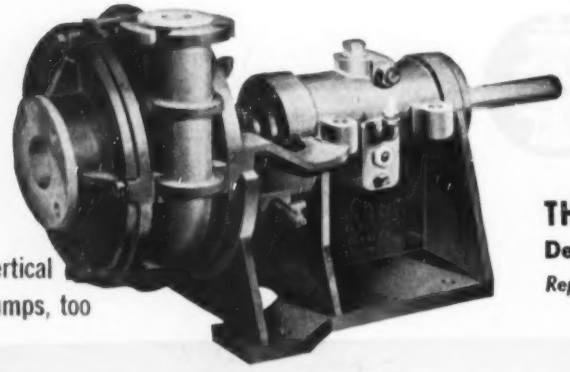
35 cents a copy
In sterling 3s


TEN YEARS SERVICE
This Eimco Model 21 worked ten consecutive full years before removed from mine for overhaul. Total cost new parts for overhaul $21.16.
EIMCO
THE EIMCO CORPORATION

How we know what Hydroseals will do for you



Engineering and guesswork don't get along very well together—at least, not for long. To keep guesswork out of Hydroseal engineering, we've kept complete performance records on almost every pump we've sold. These records contain a description of the pump, its operating conditions, power requirements and all repair parts ordered. Naturally, almost every conceivable pumping condition is included, and the biographies cover a span of years. In most cases, users have found that Hydroseals have paid for themselves in less than a year in power savings alone, with lowered maintenance costs an additional bonus. If you'd like to know what a Hydroseal will do under *your* specific conditions, write us.



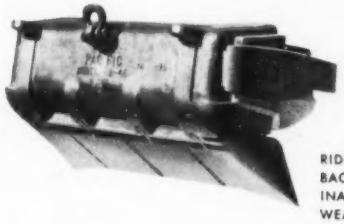
Vertical pumps, too

Ask for Catalog No. 552

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives throughout the World

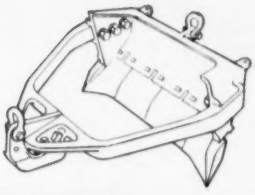
HYDROSEAL

Proved around the World



RIDES ON RUNNERS ON BACK-HAUL. THIS ELIMINATES UNNECESSARY WEAR, PROVIDES FOR LONGER SERVICE LIFE.

RIDES ITS LOADS
Saves Horse Power



CAN CHANGE BLADES AND SIDE CUTTERS UNDERGROUND
Easy disassembly permits moving scraper into any working place.

LOW CENTER OF GRAVITY
Practically impossible to turn over. Doesn't fish-tail.

DESIGNED FOR DIG-ABILITY
Digs in and gets a full load on a single pass, regardless of size or type of material or slope of muck pile.

SIZES TO SUIT YOUR REQUIREMENTS

Model	*Size*	*Weight*
2A	26"	398#
2A	30"	457#
2A	34"	485#
AB	36"	656#
AB	42"	698#
2B	36"	1240#
2B	42"	1346#
2B	48"	1432#
2C	60"	2275#

Pacific "Slushmaster" Scrapers are proving their dig-ability and stand-up-ability under almost every conceivable condition in all parts of the world—in the Philippines, Africa, South America, Mexico, the U.S.A. and Canada. The acceptance of these scrapers by mining companies everywhere is due to their design superiority.

They dig in, secure a full load in a single pass and then carry it with less horsepower. Here are typical quotes from satisfied customers: "Best breast cleaning scraper ever designed,"..."It's the 'slushingest' bucket I've ever seen,"..."You have to see 'em work to believe it." Send for Bulletin No. 215 for complete information.

BE SPECIFIC—ORDER PACIFIC. For added efficiency, use Pacific Sheave Blocks, Sheave Anchors, "Round-The-Corner" Sheave Blocks, Jaw Crushers, Bit Knockers and Pacific Wearing Parts.

ALLOY STEEL & METALS CO.

★

ALLOY STEEL & METALS CO., 1848 East 55th Street, Los Angeles 58, California
(Mailing address: Box 15323 Vernon Station, Los Angeles 58, California)

Nothing too rough or tough for Thermoid Conveyor Belting

Thermoid's long experience and continuing research *in the field*, pays off with real economy, maximum efficiency and greater tonnage for your belting dollar. Regardless of the size or kind of material—light or heavy, soft or abrasive, hot or cold, wet or dry—whatever the job, it's a good bet that Thermoid has solved the same or a similar problem with a belt that will do the job better.

In most cases, your Thermoid distributor can select the belt that will serve your needs most economically. Where unusual conditions exist, he will call in an experienced Thermoid Sales Engineer.

Get in touch with your Thermoid distributor or write direct for a copy of the Thermoid Conveyor Belting Catalog No. 3679.

It will pay you to specify Thermoid

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah

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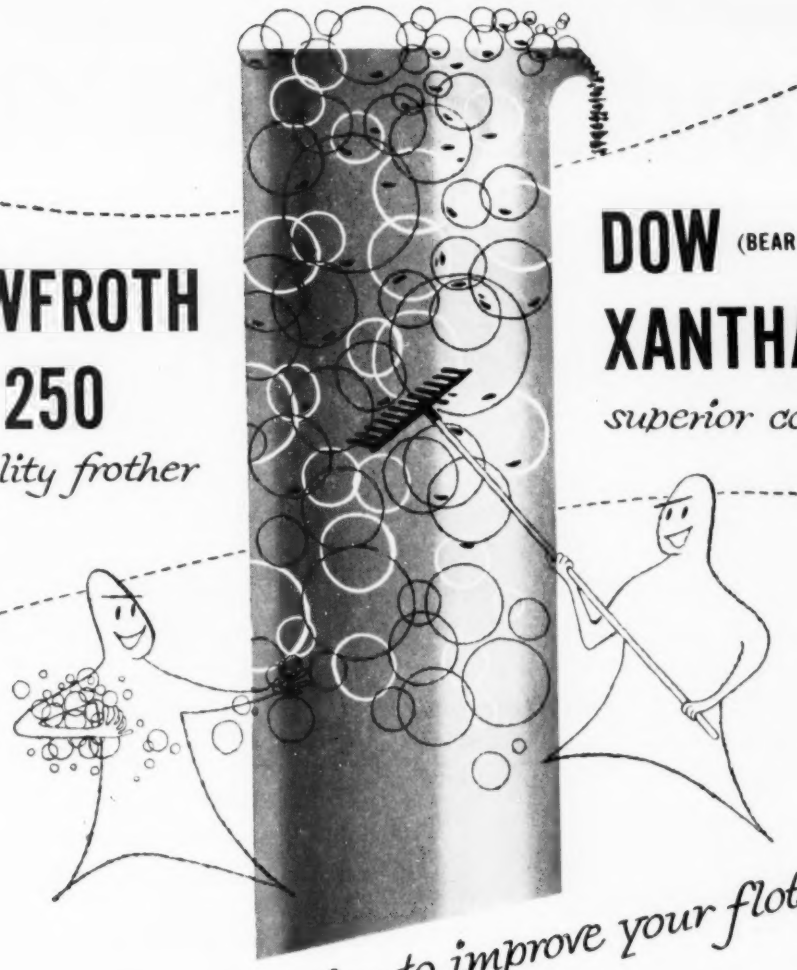
DOWFROTH 250

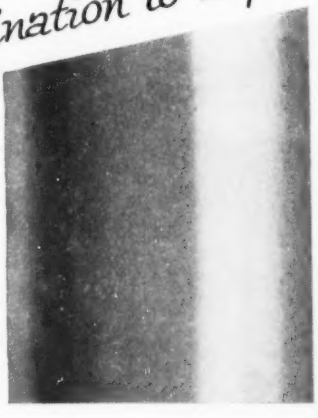
a quality frother



DOW (BEAR BRAND) XANTHATES

superior collectors

an effective combination to improve your flotation!



DOWFROTH 250—An economical frother, Dowfroth 250 in actual mill tests has demonstrated *excellent* frothing characteristics with *one-fourth of normal concentrations!* It produces a livelier froth on the machine, quicker breaking in the launders and pump boxes, and more effective mineral recovery. Having little or no collecting power, Dowfroth 250 offers the advantage of independent regulation of frother and collector for good control. Try Dowfroth 250—write to Dept. OC 31 for your *free* mill-test sample!

DOW XANTHATES—For greatest efficiency and economy in the separation of sulfide minerals, Dow xanthates are unexcelled! These uniform quality collector reagents give greater concentration and maximum recovery. To allow extreme selectivity, Dow offers a wide range of xanthates—all possessing good collector power. For more detailed information on Dow xanthates and what they will do for you, write to Dept. OC 31.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

"CONSOLIDATION COAL"

...with 2 rubber-tired Tournadozers

Consolidation Coal Company, (Ky.), a division of Pittsburgh Consolidation Coal Company, operates 4 mines and 2 preparation plants within a 20-mile radius of their offices at Jenkins, Kentucky. One of their 2 rubber-tired C Tournadozers handles all clean-up work at their "Beefhide" spread . . . the second "C" is on standby duty to handle emergency jobs at *all four* mines and the Jenkins Preparation Plant. This rubber-tired unit drives to the scattered job locations under its own power . . . travels over paved highways, limestone and red-dog surfaced mine roads, across tracks, up and down 20% grades at speeds up to 19 m.p.h. It is ready to go *anywhere* at a moment's notice. No blocking, loading or unloading delays at any time! With high speeds on rubber, it puts spare time to work . . . drains refuse areas . . . strips overburden . . . hauls equipment on low-bed trailers . . . handles many other odd jobs.

Saves 1" to 2" of coal on clean-up work

On clean-up assignments, Tournadozer's low-pressure tires reduce coal waste . . . don't dig coal into the ground or grind it into unrecoverable fines. At the "Beefhide" mine, for example, Consolidation's Tournadozer saves an estimated 1" to 2" of coal on its continuous cleaning operation.

Mobile Tournadozer gives "Consolidation" important *mechanical* advantages, too! 186 h.p. engine and 4-wheel drive put plenty of power behind the rugged 2½-yard blade. Instant-shift selection of 4 forward speeds saves vital momentum . . . lets operator drift loads in higher gears. Reverse speeds to 8 m.p.h. cut non-productive time on return half of cycle for more passes per hour. Big 21.00 x 25 low-pressure tires give plenty of sure-footed traction in soft material. Powerful 4-wheel, disc-type air brakes assure fast, safe control at all times.

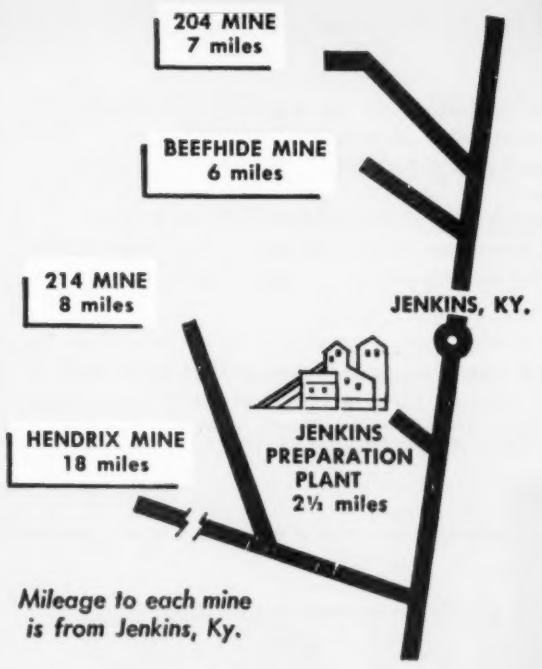
Your LeTourneau Distributor will be glad to show you the Tournadozer in action, so you can judge these advantages for yourself. Call him next time you're considering dozers.

Tournadozer—Trademark Reg. U. S. Pat. Off. D-32-CM

R. G. LeTOURNEAU, INC.
Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING •

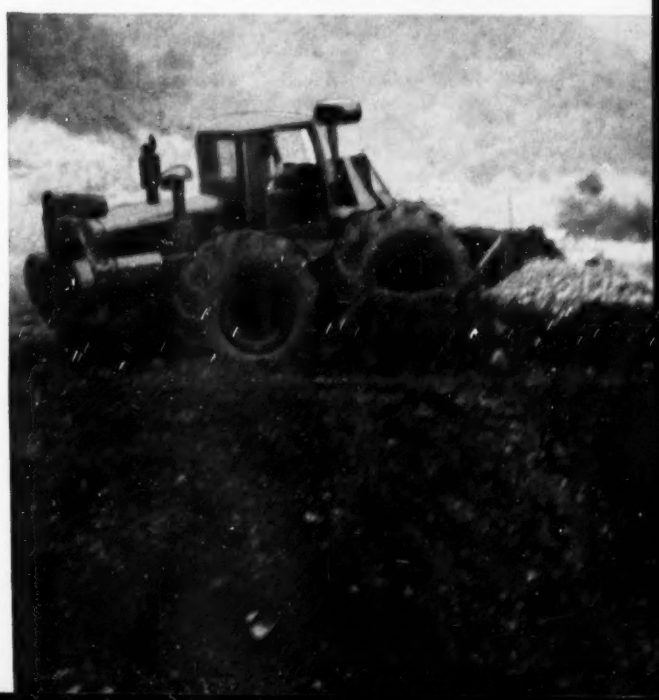
SERVICES 4 MINES...



Mileage to each mine is from Jenkins, Ky.

At the Hendrix mine slate dump, Tournadozer pushes its load of truck-dumped slate 75' in 2nd gear (3.7 m.p.h.) . . . returns to dumping point in high reverse (8 m.p.h.).

Tournadozer works on loose spoil banks or hard-packed coal seams without damaging coal surface . . . completes dozing cycles in ½ to ⅓ the time required by crawler-tractors.

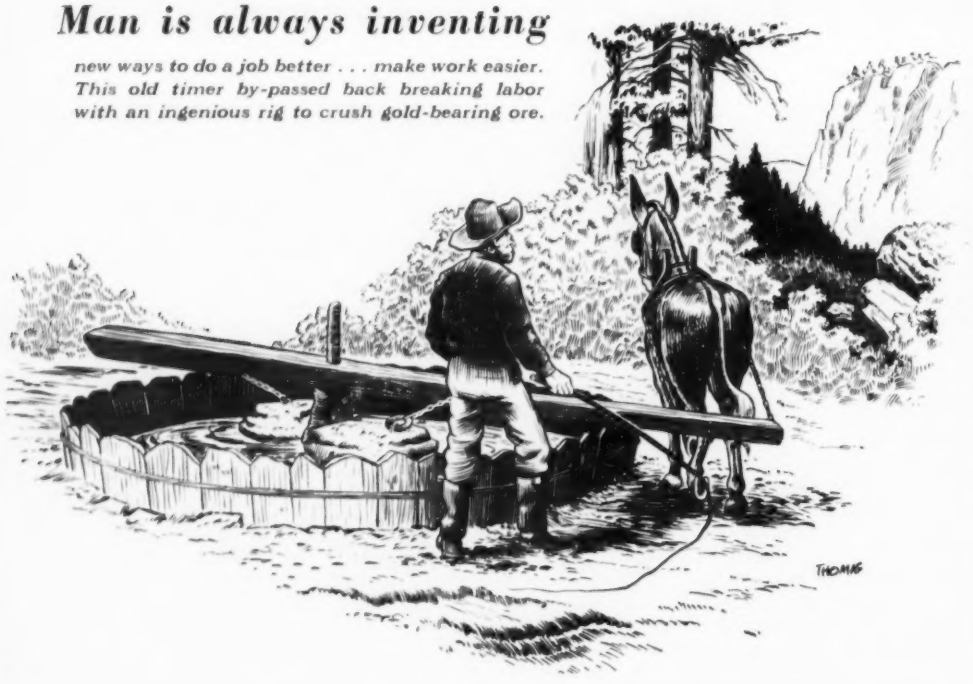


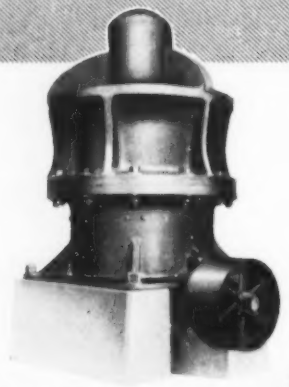
HAULING • LIFTING EQUIPMENT

R.G. LeTOURNEAU EQUIPMENT

Man is always inventing

new ways to do a job better . . . make work easier. This old timer by-passed back breaking labor with an ingenious rig to crush gold-bearing ore.





The Traylor TY Reduction Crusher incorporates maximum efficiency with easy maintenance for top performance on the job. Ask for Bulletin 6112 for complete details.

The mining industry is famous for its ingenuity in finding ways to speed production while obtaining a better product. For 50 years, Traylor has fostered this ability by constantly improving crushing machinery. As in the past, so in the future, each year brings new methods—and new problems—to the industry. Mining men know that experience is their best source for solving these problems. Traylor has experience . . . half a century of it.

OUR GOLDEN ANNIVERSARY YEAR

1902 1952

TRAYLOR ENGINEERING & MANUFACTURING CO.

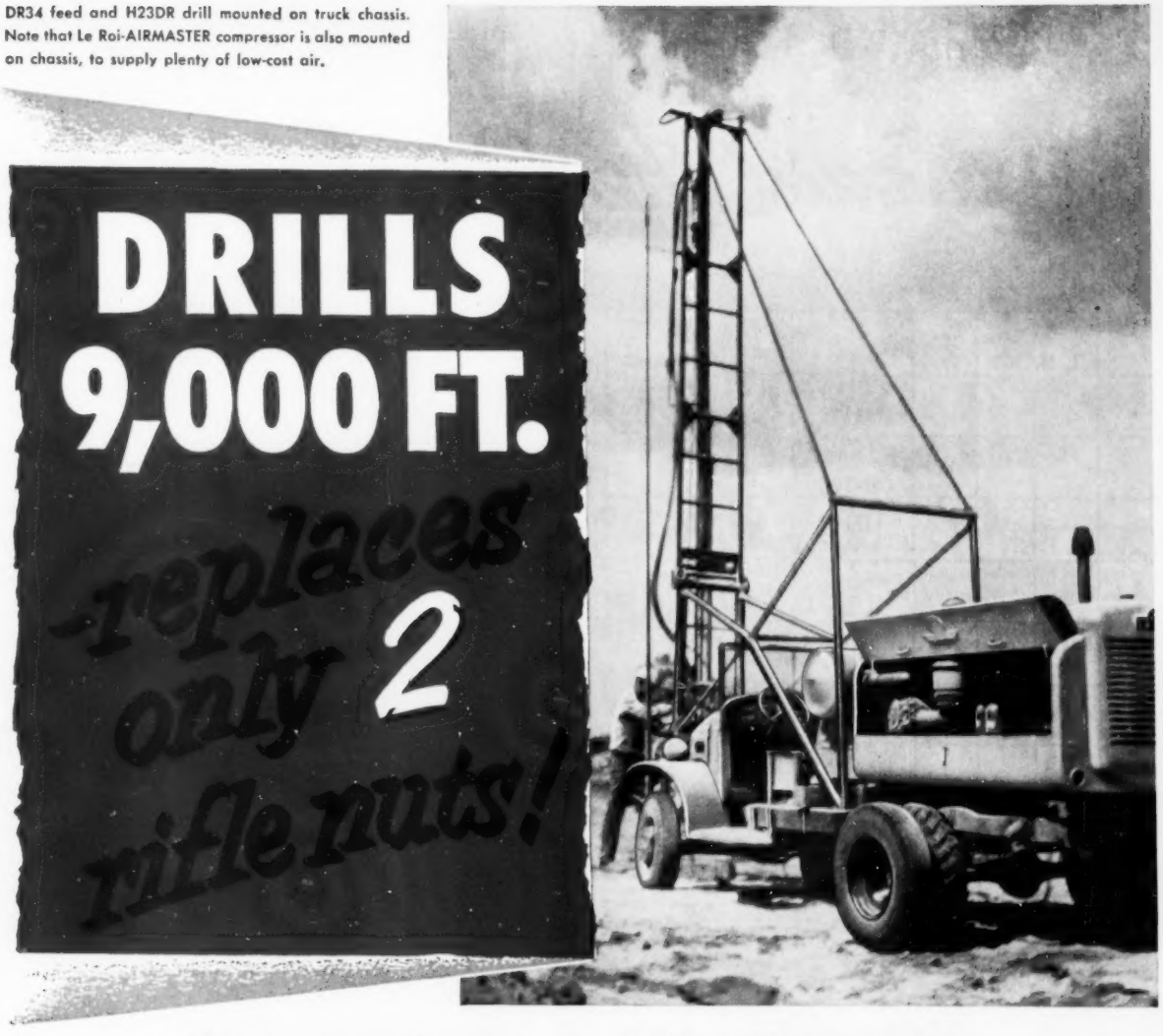
1483 MILL ST., ALLENTOWN, PA.

SALES OFFICES: New York, Chicago, San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P. Q.

a **Traylor** *leads to greater profits*

DR34 feed and H23DR drill mounted on truck chassis. Note that Le Roi-AIRMASTER compressor is also mounted on chassis, to supply plenty of low-cost air.



Uranium operation gets remarkable performance from LE ROI-CLEVELAND AIR FEED and H23DR DRILL

HOLES as deep as 120 feet drilled with sufficient air for hole cleaning! 18 feet of hole in 12 to 14 minutes, with 90 to 95 psi air pressure. Mister, that's real drilling! And it's typical of the money-making performance you get with Le Roi-CLEVELAND rock drills.

The DR34 air-feed shell provides a 21′ feed with 20′ steel change. The drill is a Le Roi-CLEVELAND 80-lb. H23DR with 5/16″ blowing, strong rotation, positive valve action, plenty of wallop, and dependable durability. Chuck size is standard — 1″ hex, 4-1/4″ shank. Octagon or round-lug shanks can be used, also.

Though 120′ holes have been sunk in uranium-prospect drilling operations — using jointed steels and standard forged steel-type detachable bits with stellited corners — average drilling depth with the DR34 for blast holes is 40′ to 50′, depending on the contour of the terrain.

On deep-hole work, enjoy more footage per shift — do your drilling better, faster, for less — with Le Roi-CLEVELAND machines.

Write today for complete information.

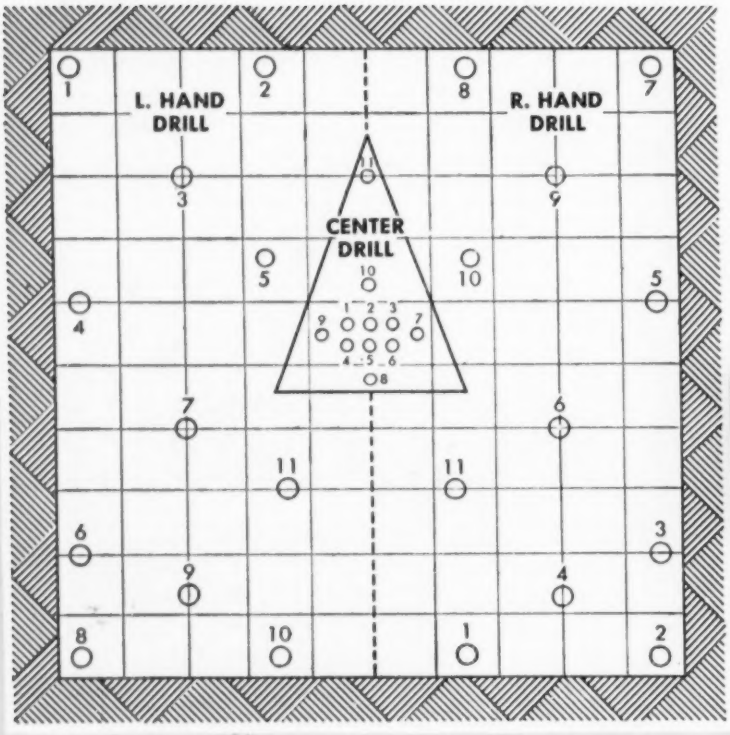
LE ROI COMPANY

RD-46

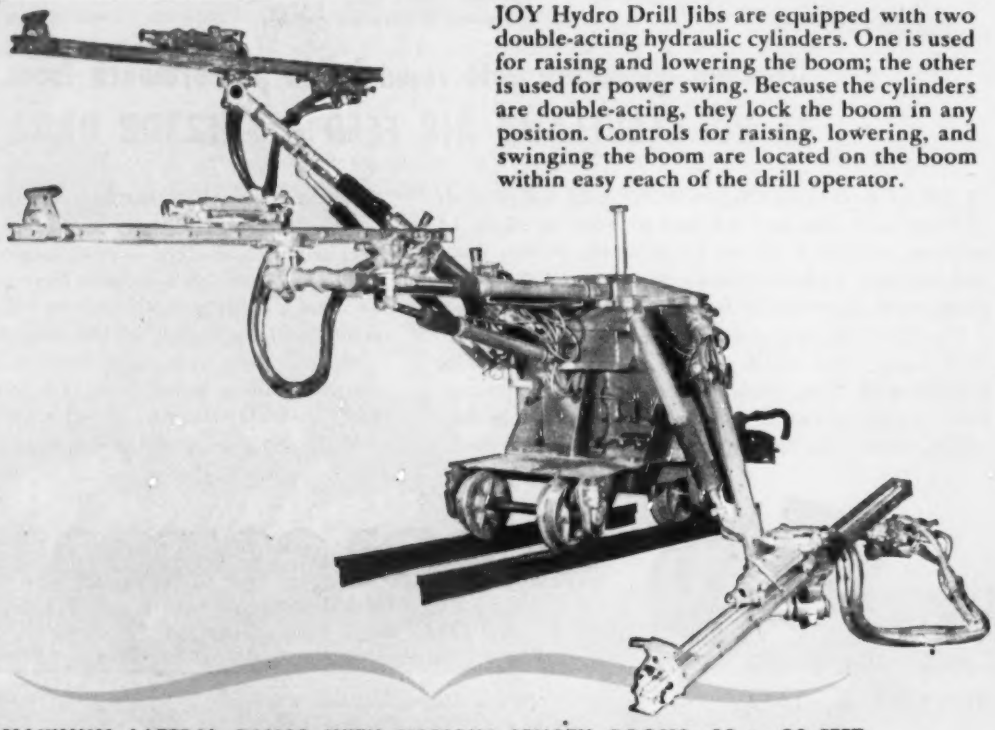
CLEVELAND ROCK DRILL DIVISION
12500 Berea Road, Cleveland 11, Ohio
Plants: Milwaukee, Cleveland and Greenwich, Ohio

"DRILL OUT THIS ROUND"

said the Joy Engineer . . .



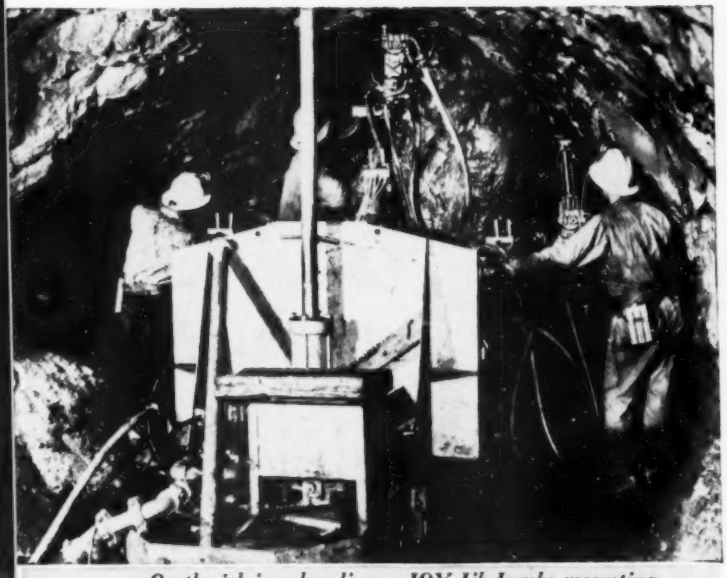
JOY Hydro Drill Jibs are equipped with two double-acting hydraulic cylinders. One is used for raising and lowering the boom; the other is used for power swing. Because the cylinders are double-acting, they lock the boom in any position. Controls for raising, lowering, and swinging the boom are located on the boom within easy reach of the drill operator.



MAXIMUM VERTICAL RANGE WITH VARIOUS LENGTH BOOMS: 10 to 14 FEET

MAXIMUM LATERAL RANGE WITH VARIOUS LENGTH BOOMS: 18 to 28 FEET

. . . "IN RECORD TIME and WITH LESS EFFORT with JOY HYDRO DRILL JIBS"



On the job in a heading: a JOY Jib Jumbo mounting three Hydro Drill Jibs with JOY T-300 drifters.

JOY builds a complete line of Jib Jumbos and Drillmobiles. Above: a twin-boom JOY Drillmobile, rubber-tired and self-propelled for quick, easy mobility.

The recommendation above was made by one of Joy's drill mechanization specialists. He made it to a mining company which is now a satisfied user of the equipment recommended: four Joy Jib Jumbos (see facing page) each mounting three Joy T-300 Drifters on LW-6A long chain feeds. He went on to say—

"The LW 6A feed, easily supported by the Hydro Drill Jib, has an overall travel of 8 feet with a steel change of 6 feet. Thus, the proposed round can be drilled with one length of steel."

He then proposed and fully explained a drilling pattern (again see facing page) for a 10′ x 10′ round, showing the location of the eleven holes to be drilled by each one of the three jib-mounted drills. Basically, the plan provided for the least interference, and the maximum amount of drilling without dumping or swinging the drills. The holes for each drill were numbered so that the spreads between gave the runners plenty of working room. He closed by saying—

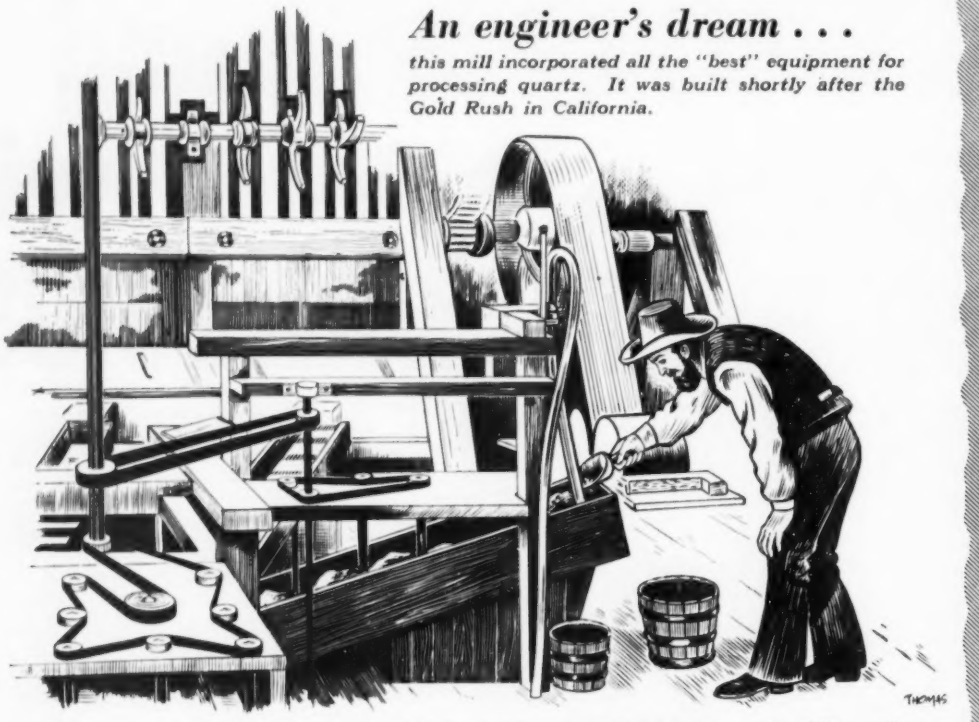
"The purpose of this proposal is to describe the many advantages of Joy fully automatic Hydro Drill Jibs. Joy pioneered the hydraulic drill jib and is still maintaining the lead in the design of this type of rig. We are keeping ahead with sound, practical improvements, and today believe we produce the finest drilling equipment available."

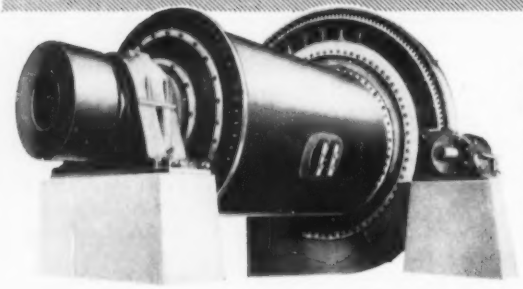
● Why not let a Joy drill mechanization specialist look over your problem and solve it the way he did this one? *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

W&D GL-4302

An engineer's dream . . .

this mill incorporated all the "best" equipment for processing quartz. It was built shortly after the Gold Rush in California.





As great mining developments opened up in our country, the mining industry repeatedly devised more efficient methods to increase production. These improvements in technique came hand-in-hand with the invention of better equipment. For 50 years, Traylor has led in designing advanced crushing machinery to meet the growing demands of the industry. Mining men know that experience is their most dependable guide for matching machines with methods for best results. Traylor has experience . . . half a century of it.

Traylor builds Ball, Rod, Tube and Compartment Mills. Each type is produced in a wide variety of sizes to meet your exact needs.

OUR GOLDEN ANNIVERSARY YEAR 1902 1952

TRAYLOR ENGINEERING & MANUFACTURING CO.

1473 MILL ST., ALLENTOWN, PA.

SALES OFFICES: New York, Chicago, San Francisco
Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P. Q.

a **Traylor** *leads to greater profits*

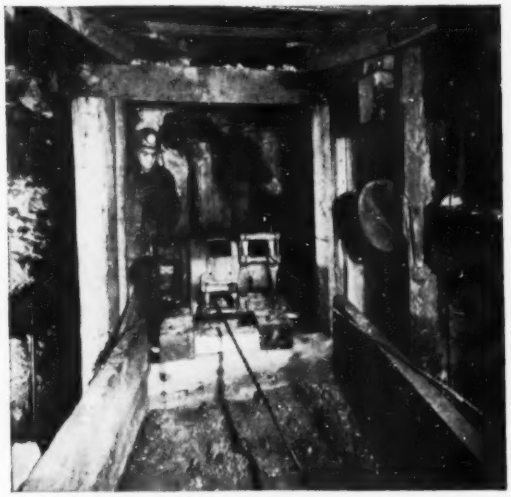
SAVE MONEY

ON EVERY TRIP

YOUR SCRAPER MAKES

WITH THE GARDNER-DENVER

AIR SLUSHER



HERE'S HOW:

***Steady power*—for a full pay load every trip.**

***High speed*—for more trips per shift.**

***No air-waste idling* between trips.**

***Single throttle control*—readily mastered by your new miners.**

***Three sizes*—to fit your scraper capacity efficiently.**

Write today for Bulletin AS-3 on Gardner-Denver Airslushers and Air Hoists.

Powerful—Flexible Single Drum Air Hoists
Develop full speed and power in either direction. Compact and lightweight for easy moving about underground. Your choice of several sizes and rope capacities.

SINCE 1859

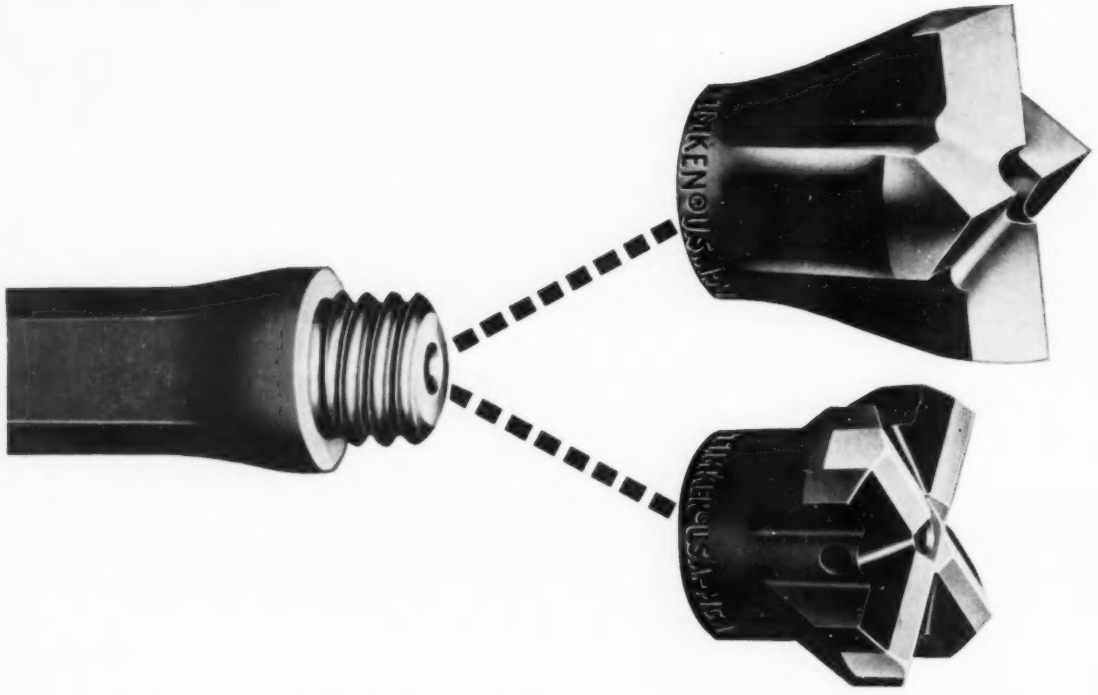
GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois, U. S. A.

Export Division: 233 Broadway, New York 7, N. Y., U. S. A.

THE QUALITY LEADER IN COMPRESSORS PUMPS AND ROCK DRILLS

USE THE SAME STEEL FOR BOTH ROCK BITS!



Switch bits as the ground changes . . . right on the job!

DRILLERS need only one steel on the job when they use Timken® rock bits. Both Timken multi-use and carbide insert bits, in the same series, fit the same threaded drill steel.

In drilling ordinary ground, Timken multi-use bits, when correctly controlled and reconditioned, give you the lowest cost per foot of hole when full increments of steel can be drilled.

When you hit hard, abrasive ground, quickly switch to Timken carbide insert bits for maximum speed and greatest economy. They're your best bet for very deep holes, small diameter blast holes and constant gage holes.

Both Timken bit types have three big advantages: (1) made from electric furnace Timken fine alloy steel, (2) threads are not subject to drilling impact because of the special union developed by the Timken Company, (3) can be changed quickly and easily.

If you're in doubt about the best bits for *your* job, call upon the 20 years' experience of the Timken Company's Rock Bit Engineering Service. Engineers will study your problem and recommend the most economical bit for your job. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

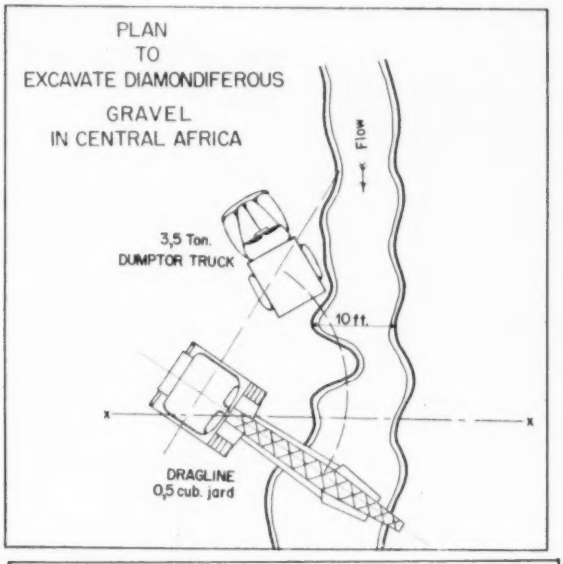
your best bet for the best bit . . . for every job

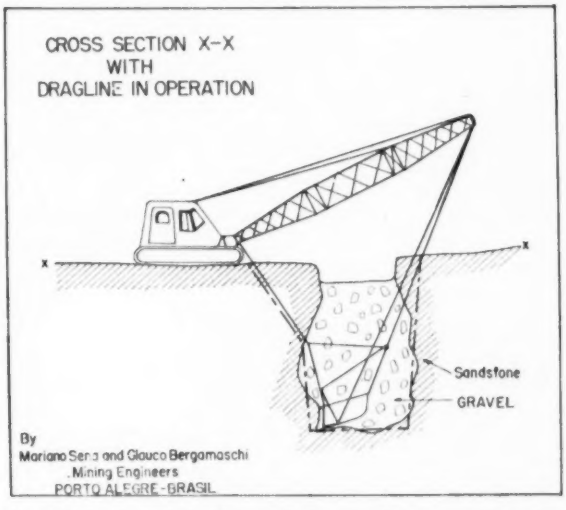
GRAB SAMPLES From the Mail

Diamond Mining Solution From Brazil

Dear Sir:

We have taken knowledge of Mr. Berger's diamond mining problem outlined on page 12 of the June 1952 issue of *Mining World*. We wish to present our solution as follows: Our viewpoint is that the diamondiferous gravel can be exploited with





the aid of a ¾-yard dragline and the gravel transported to the washing plant by means of a dump truck without the necessity of pumping out the river bed. Sandstone (stream bank) hardness was not mentioned but we presume that it would not interfere with the mining procedure outlined in the accompanying diagrams.

Mariano Sena Sobrinho, mining and civil engineer
Glauco Bergamaschi, mining engineer
Porto Alegre, Brazil

Thanks for this solution. It is being forwarded to Mr. Berger in Africa for his comments.—Ed.

PACIFIC FURNACE

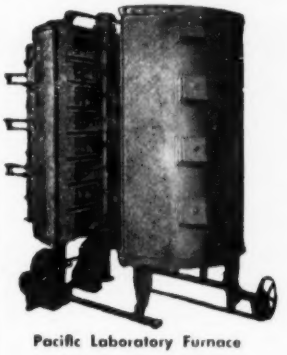
MULTIPLE HEARTH FURNACE

ROASTING
CALCINING
DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
TIN ORES	MOLYBDENUM
NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASHES	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY GRANULES
PYRITE	ANTIMONY

SELENIUM
SEWAGE SLUDGE
LEAD CHEMICALS
METALLIC SLUDGES
FILTERING MEDIA
And for Numerous Other Materials

SIZES 8' 6" TO 22' 3" DIAMETER
NUMBER OF HEARTHS, 1-16



Pacific Laboratory Furnace

PACIFIC LABORATORY FURNACE

Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.

Pacific Furnacing Unit

NEW
PACIFIC FURNACING UNIT

Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.

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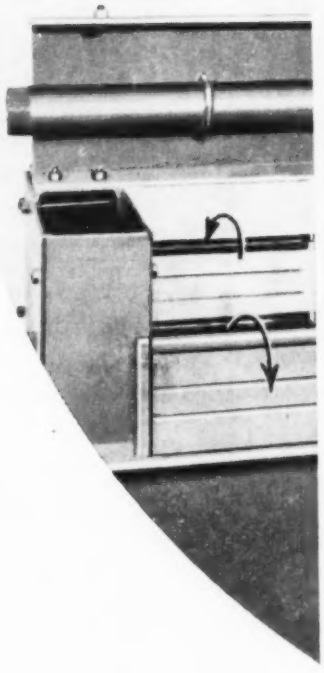

New Denver "Sub-A" Super-Rougher Flotation Machine gets you more values from roughing and scavenging circuits

You get more profits from your ore with the NEW Denver "Sub-A" Super-Rougher Flotation Machine—developed especially for low-grade ores. Yesterday's tailings may be today's profits, because of the price of metal. The Denver "Sub-A" Super-Rougher Flotation Machine is designed to get these extra profits out of your scavenging and roughing circuits!

This Denver "Sub-A" Super-Rougher Flotation Machine gives you the intense aeration necessary to get the most values from your roughing and scavenging circuits.

Controlled feed to the agitation chamber, supercharged aeration, an adjustable sand relief opening, and controlled pulp level give the flexibility in this low level, double overflow flotation machine that your flotation engineer *must* have for maximum results and profits.

Phone, write or wire today for more information! Find out how you can reduce tailings values and increase your mill efficiency by using Denver "Sub-A" Flotation—the world's leading manufacturer of flotation machines.

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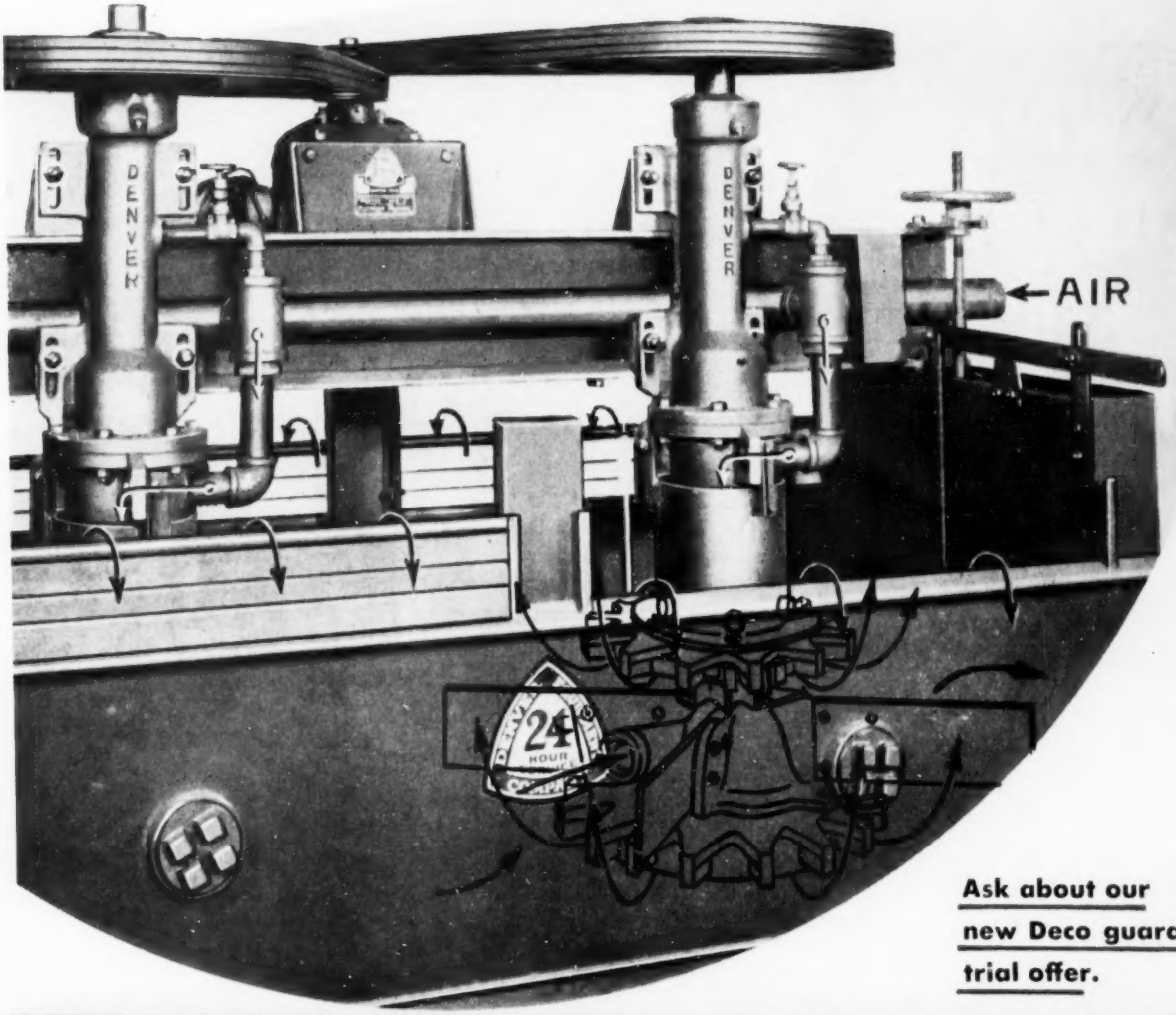

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EQUIPMENT COMPANY

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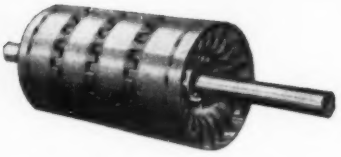
Which Answers Your Tramp Iron Problem BEST?

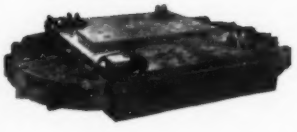
MAGNETIC PULLEYS?



Powerful, air cooled electro magnetic pulleys are ideal where well loaded conveyor belts are used. Installed as head drive pulley, tramp iron is discharged automatically. Low operating cost, long life and extreme power characterize this workhouse of the Dings line. Catalog C-1001A tells you why this magnet is exceptionally efficient.

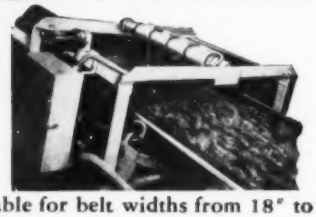
Dings *non-electric, self-energized* Perma Pulley magnets are recommended where burden depths do not exceed 3". Within this range, these are the magnets to use because of their unsurpassed concentration of magnetic strength near the surface. Catalog C-1007A.

SUSPENDED RECTANGULARS?



Power close and power that searches down as deep as 30" to yank tramp iron out. If the Dings RM rectangular won't do it, it can't be done. Triple pole, double gap design. Install horizontally, vertically or at an angle above belt conveyors or in chutes. Self-cleaning fully automatic models also available. Write for details.

MAGNETIC DETECTOR?



The Dings Magnetic Detector instantly signals when any magnetic object large enough to be damaging passes through the detector zone. Can be hooked up to sound an alarm and stop the belt. Ideal protection for crushers, grinders, pulverizers, etc., where belt speeds are so excessive or burden depths so great no magnetic separator can function successfully. Detectors are available for belt widths from 18" to 72". Two types are available. One employs an electro magnet and the other, a permanent magnet. Performance of the two is comparable.

Magnets shown here are available in size ranges for most applications. Special magnets can be made for any application. Write today for recommendations.

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Micrometer Depth Indicators in the Console, for example, is just one of the advanced engineering features that has made Nordberg the leader in the design and development of modern mine hoists. This, and many other important engineering refinements, assures the very best in workmanship and materials to give you the ease of operation, safety and dependability which has made Nordberg Mine Hoists the standard for comparison.

No matter what your hoisting requirements may be, you will find that Nordberg hoist engineers are fully qualified to solve your specific problems. Write for further details, or send for Bulletin 190.

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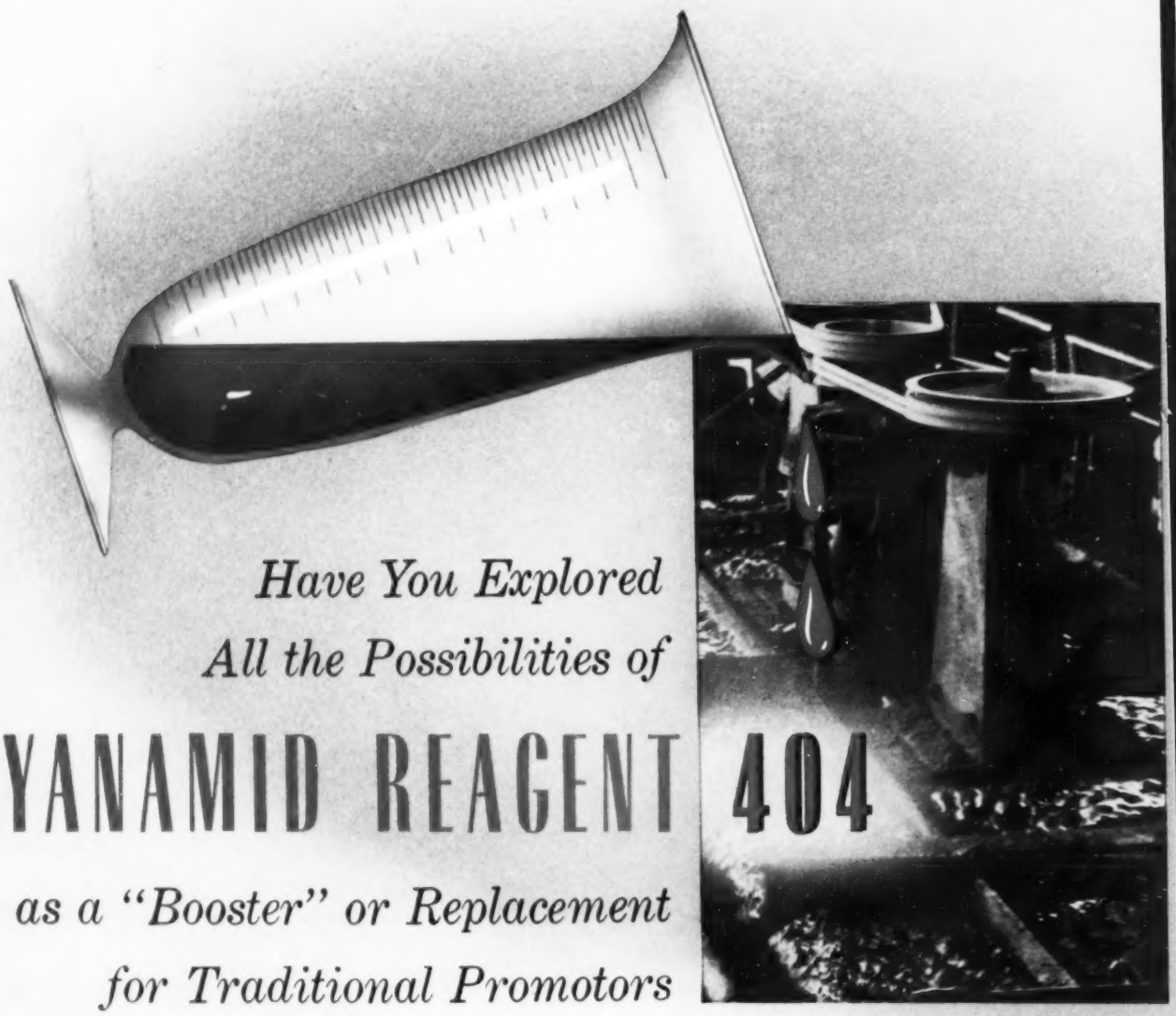

Have You Explored
All the Possibilities of

CYANAMID REAGENT 404

as a "Booster" or Replacement
for Traditional Promotors

Challenging time-honored ideas on reagent combinations, more and more metallurgists are sharpening selectivity, increasing recovery and reducing reagent costs by introducing Cyanamid Reagent 404 in their flotation circuits.

Fastest growing among the newer reagents in Cyanamid's complete line of metallurgical chemicals, Reagent 404 is already being used alone and in combination to beneficiate auriferous pyrite and pyrrhotite, tarnished and oxide lead, lead-zinc, copper-zinc, copper-lead, free gold, cobalt, antimony as well as other complex precious and base-metal ores. Each year, Reagent 404 finds new applications beyond its anticipated sphere of use.

Consider these four typical examples of the introduction of Cyanamid Reagent 404 as a "booster" or replacement for less effective promotors:

AMERICAN *Cyanamid* COMPANY

COPPER–PYRITE ORE, SILICIOUS GANGUE

PROBLEM: To reduce insoluble content of concentrate and increase copper recovery.

SOLUTION: Using Reagent 404 as part replacement of previous promotor produced these comparative test results in the mill.

		PROMOTOR lbs./ton	FROTHER lbs./ton	REAGENT COST	CONCENTRATE % Cu	CONCENTRATE % Fe O	CONCENTRATE % Insol.	TAILING % Cu
Previous	Promotor X	.05	0.20	5.67¢	25.0	28.6	16.2	0.254
Present	Promotor X	.025	0.045	3.29¢	24.6	31.6	12.3	0.206
	Reagent 404	.032						

RESULTS: Reagent 404 lowers insoluble in concentrate and cuts reagent costs 42% (2.38¢ per ton of feed.)

PARTIALLY OXIDIZED LEAD ORE CONTAINING GALENA AND CERUSSITE

PROBLEM: To simplify the flow sheet and improve recovery of lead.

SOLUTION: Use Reagent 404 in place of usual type promotor and sulfidizing agent.

	ASSAY			
Product	% Wt.	% Pb	% N.S Pb	% Distribution of Lead
Feed	100.0	11.05	2.91	100.0
Concentrate	16.6	65.0	—	97.6
Cleaner Tailing	4.4	2.23	—	0.9
Rougher Tailing	79.0	0.20	0.16	1.5

RESULTS: Excellent metallurgy with simple flow sheet and reagent combination. Water reclamation and circulation entirely feasible since Reagent 404 does not disperse tailing and thus interfere with thickening as would Sodium Sulfide. Galena and cerussite are floated in a single circuit, as compared with the necessity for two separate flotation circuits when a sulfidizing agent is used to recover cerussite.

AURIFEROUS PYRITE WITH NO FREE GOLD. CLEAN SILICIOUS GANGUE

PROBLEM: To increase recovery and reduce reagent cost.

SOLUTION: Use Reagent 404 as total replacement for promotors previously used.

		PROMOTOR lbs./ton	FROTHER lbs./ton	REAGENT COSTS	ASSAYS, Au, Oz./T FEED	ASSAYS, Au, Oz./T CONC.	ASSAYS, Au, Oz./T TAIL
Previous	Promotor A	0.10					
	Promotor B	0.05	0.07	5.23	0.129	5.16	0.006
Present	Reagent 404	0.05	0.05	2.60	0.175	5.07	0.005

RESULTS: Reagent 404 increases recovery of copper, lowers tailing by 3½¢.

GOLD–SILVER–LEAD–ZINC ORE

PROBLEM: To increase recoveries of gold, silver, and lead in the lead concentrate.

SOLUTION: Use of Reagent 404 as part replacement of previous promotor combination gave these comparative results.

		PROMOTOR lbs./ton	FEED, Oz./ton Au	FEED, Oz./ton Ag	FEED, % Pb	Pb Conc. Oz./ton Au	Pb Conc. Oz./ton Ag	Pb Conc. % Pb	Recoveries, Pb Conc. Au	Recoveries, Pb Conc. Ag	Recoveries, Pb Conc. Pb
Previous	Promotor A	0.10	0.12	4.2	2.5	0.80	36.0	24.7	43.0	56.8	65.1
Present	Promotor A	0.04	0.14	4.4	2.6	0.83	31.1	22.3	51.8	59.4	71.6
	Reagent 404	0.02									

RESULTS: Use of Reagent 404 increased the recovery of Gold 8.8%, the recovery of silver 3.4% and the recovery of lead 6.5%. Simultaneously, reagents costs were reduced by 1¢ per ton.

An objective review of your reagent combinations and treatment methods in the light of recent milling developments may reveal that Cyanamid Reagent 404 (or its companion Reagents 425 and 444) can help you to achieve lower cost-plus-tails on your present ore now and make it economic to treat lower-grade mill feed in the future.

Cyanamid Field Engineers and Cyanamid Mineral Dressing Laboratory keep constantly informed on metallurgical chemical advances and flow-scheme modifications in every mining field the world over. They stand ready to give you unbiased counsel and practical help in your reagent studies . . . to bring you the benefits of Cyanamid's fundamental research, testing facilities and on-the-mill experience in applying more efficient reagents and processes. Your inquiry is invited.

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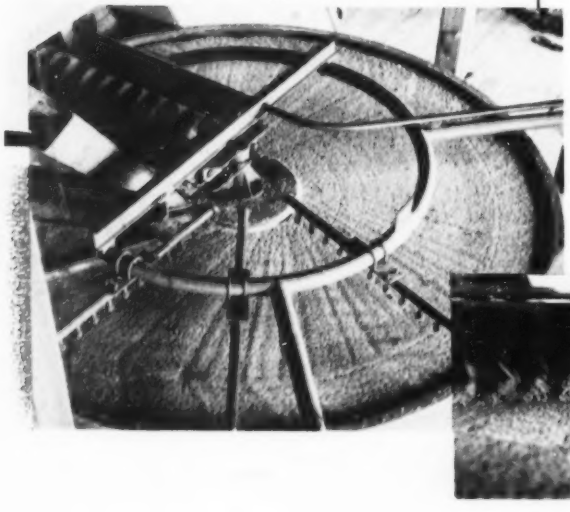

Built in Germany by Dorr Gesellschaft m.B.H., this four meter dia. Oliver Horizontal Filter handles 1800 metric tons per day of salt crystals. The small photo clearly shows the effective operation of the scroll discharger.

Oliver Filters are available through Associated Companies and Representatives of The Dorr Company in every mining area of the world except North America, Australia and the Philippines, where they are directly obtainable through Oliver-United Filters, Inc.

Strategically located facilities for the manufacture of Dorr and Oliver equipment are available in eleven countries of the world. These facilities for local fabrication, coupled with the sales engineering and technical services available through the following Associated Companies and Representatives of The Dorr Company abroad, provide a completely flexible network of engineering organization . . . established to serve worldwide metallurgy with maximum effectiveness.

We invite you to consult any of the following, or, if you prefer, address your inquiry to The Dorr Company at Stamford and it will be forwarded to the area best able to serve you.

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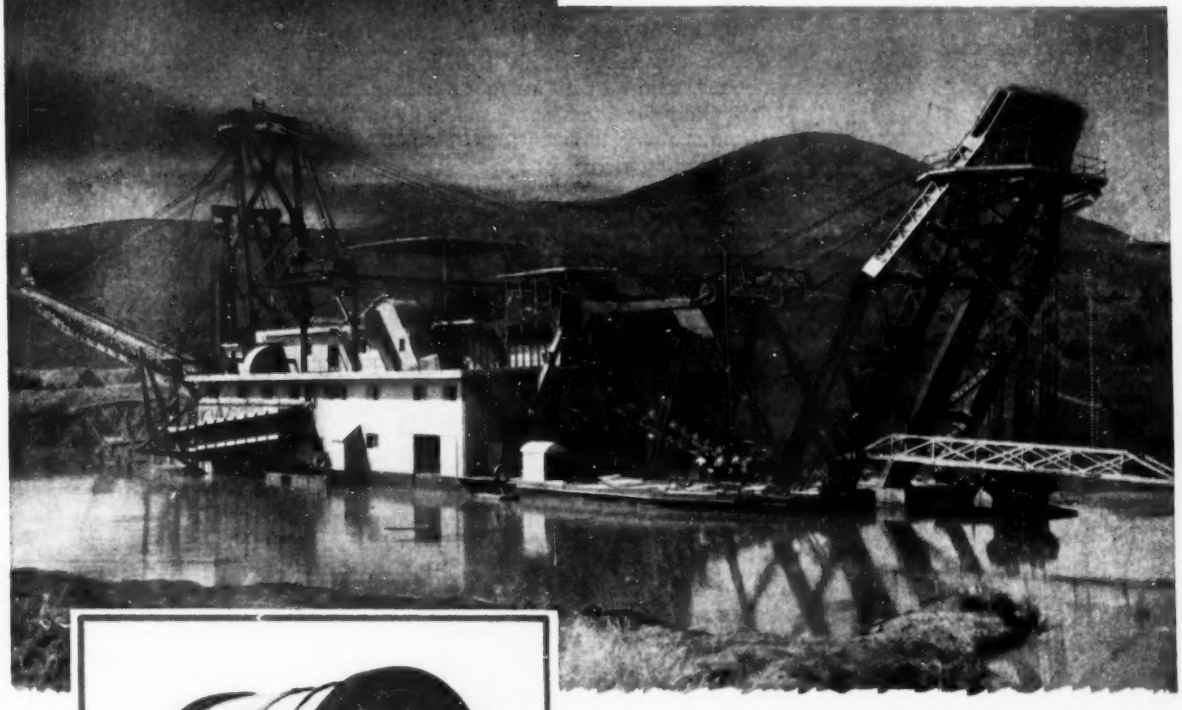

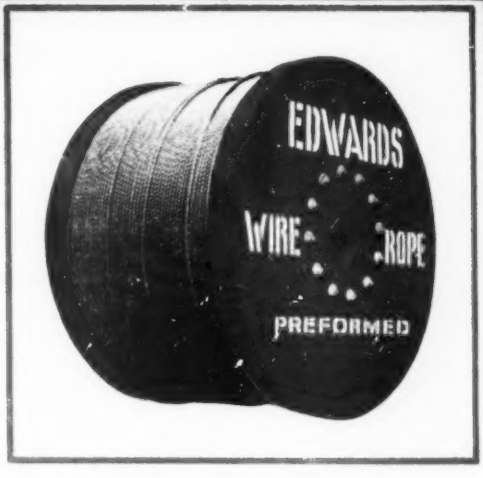

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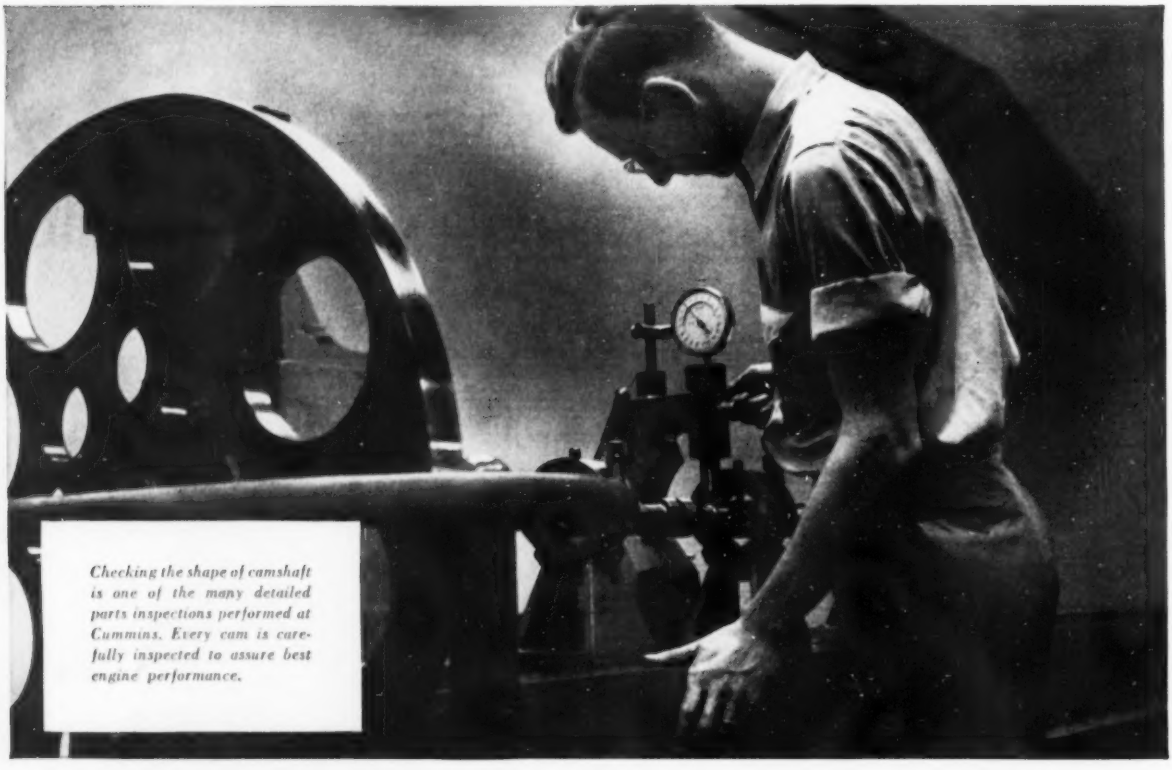

Checking the shape of camshaft is one of the many detailed parts inspections performed at Cummins. Every cam is carefully inspected to assure best engine performance.

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Every Cummins Diesel is custom-built to fit your job . . . give you years of dependable, profitable service. To make the most of Cummins performance—and keep "down time" at a minimum—it pays to use Genuine Cummins Parts for maintenance. Every Genuine Cummins Part *fits perfectly, lasts longer* . . . because it's manufactured with *twice the care.* So *always* insist on Genuine Cummins Parts – available only from Cummins dealers coast to coast. See the dealer nearest you.

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MINING WORLD

and the export edition

WORLD MINING

A Miller Freeman Publication

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NOVEMBER, 1952

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DRIFTS AND CROSSCUTS

Why Not a Flexible Zinc Tariff?

The recent drastic drop in the price of Prime Western zinc to 13.5 cents per pound, East St. Louis, has already caused nine shutdowns in the Tri-State district, Arizona, Idaho, New Mexico, and other states. Between 20 and 40 percent of domestic production is threatened at this price.

The "rule of thumb" for producers at present labor and supply costs is that a combined zinc plus lead price of 30 cents is necessary for the domestic industry to perpetuate itself; that is, to develop a ton of ore for every ton mined—not even to expand reserves. With zinc at 13.5 cents and lead at 14.0 cents, immediate production is being lost. Of greater national consequence, exploration and development, always first to be curtailed, are of necessity being suspended at many mines.

There is need to emphasize the danger to the nation's security under this situation.

Whose purpose is furthered by the cut in the zinc price?

Whose mines will be closed—domestic or foreign?

The present zinc-in-ore duty is 0.6 cent per pound and 0. 7/8 cent on metal.

Is this part of an overall conspiracy?

There are those that say it is, that it is part of an overall plan, and that the Paley Report with its advocacy for foreign minerals is a part.

There is no question but that large consumers want cheap metal, and they eagerly eye the more than 50,000 tons of surplus zinc in Europe, much of which was initially purchased at high prices.

Another part of the picture is the drive by the internationalists to sell their products abroad for dollars, i.e., cotton and automobiles. They have no feeling about crucifying the domestic mineral raw materials producers if dumping of foreign metal will export dollars which can in turn be used by foreigners to purchase their goods.

It would appear that now is the time for the government to step in and buy zinc.

Initial government requests to buy Prime Western zinc for the stockpile found that certain interests were not selling to the government. Why?

There are those who say why doesn't the government establish a parity on zinc? Buy when the price is low. If the prophecy of the government's own Paley Report is correct, the government should make money in the long run.

Better yet—Why doesn't the mining industry cooperate and submit to congress a proposal for a flexible tariff to automatically maintain, within reasonable limits, the price level the domestic mining industry must have to perpetuate itself?

COMING CONVENTIONS

November 6 to 8, 1952. FIRST ANNUAL SOUTHWEST MINERAL CONFERENCE, sponsored by the New Mexico Mining Association and the Southwest International Mining Association. Alvarado Hotel, Aibuquerque, New Mexico.

December 2, 1952. Annual meeting AMERICAN MINING CONGRESS, University Club, New York, New York.

December 5 aad 6, 1952. NORTHWEST MINING ASSOCIATION, annual convention, Davenport Hotel, Spokane, Washington.

February 12, 13 and 14, 1953. Mining Conclave and Convention, COLORADO MINING ASSOCIATION, Shirley Savoy Hotel, Denver, Colorado.

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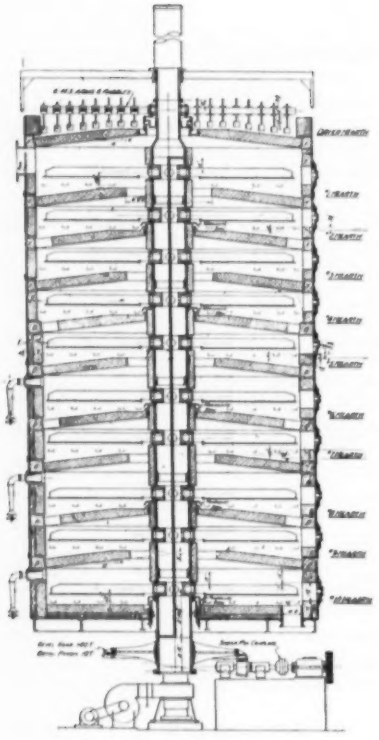
SKINNER
Multiple-Hearth Roasters

3½′ to 22′ in dia. for laboratory, pilot plant and commercial operations.



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The Skinner Roaster, as manufactured by CIW, has produced outstanding results for many years on roasting and calcining ores, clays, limestone, limestone mud; decomposing oil sludge to recover sulphuric acid; incinerating sewage, either as garbage or digested sludge to inert ash. Coal, oil or gas fired.

IMPROVED DESIGN

The current models include all of the advantages of the well-known Skinner Roaster . . . easy access during operation; quick replacement of rabble arms and teeth without cooling; cross draft and multiple gas offtakes provide wide range of temperature control.

In addition, an improved bearing arrangement results in greater efficiency and lower costs. The top guide bearing is self-lubricating; the bottom is totally enclosed spherical roller type.

It is available in sizes from 3½′ inside diameter experimental model, with 4, 6 or 8 hearths; up to 22′ with as many as 12 hearths.

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CAPITOL CONCENTRATES

DMPA EXPANSION PROGRAMS NOT AS GOOD AS STATISTICS

In a recent press release, Administrator Larson of DMPA nearly broke his arm patting himself on the back. "It should be emphasized," Larson said, "that this is not just a government program. It is a government-industry program. In my estimation, the expansion that has been accomplished so far represents one of the finest demonstrations of government-industry teamwork that the country has ever seen."

Larson then went on to say: "The list of projects includes 53 for copper; 29 for the ferro-alloys (chromium, cobalt, manganese, molybdenum, and tungsten); 92 for lead, zinc and cadmium; 5 for tin; 3 for titanium; and 131 for a dozen or more nonmetallic materials." In all, he stated, 436 expansion programs to boost the domestic production of metals and minerals were approved by DMPA during the fiscal year ending June 30, 1952. As the agency was not in existence during all of that year, Larson must also include DMA projects.

The record sounds good, although it is poor beside the old WPB accomplishments. The trouble is that unanalyzed statistics of this sort mean little until explained in detail.

For instance, DMPA may approve an expansion program and RFC refuse to loan the money. In that case the project might just as well not have had DMPA's blessing. Also, it would be interesting to know if the 53 copper projects include those to "maintain" production, rather than to expand it. Of the 19 defense loans to mining enterprises certified to RFC by DMPA, only seven had received any money up to September 15, 1952, and at least several were certified to RFC back in 1951. Of the something over $5,000,000 disbursed to the seven projects by RFC, six of them together had received less than $500,000 to the date above mentioned.

No doubt careful research into the Larson figures would reveal some other interesting facts. It is too bad that at present there is no committee or subcommittee of Congress interested in digging into the details—as the Engle mining subcommittee used to do.

• Higher Tungsten Goal Is Set

From a requirement of 9,000,000 pounds of tungsten in 1950, the Munitions Board now has came up with a figure of 40,000,000 pounds by 1954. As there seems to be no inclination on the part of DPA or DMPA to revise the tungsten program and price to a point where many domestic producers can participate, it follows that most of this will be purchased abroad.

• Who Collects The Tax Dollar?

Strange as it may seem, there was a day when taxes did not hurt. As recently as 1939 the average family paid only $397 as its share of all taxes—local, state and federal. Today, just 13 short years later, the bill is $1,934.

Who is drilling the hardest on the tax nerve? You guessed it—the federal government. A comprehensive study reveals that in 1939, state and local governments collected 63 percent of all revenues. Washington collected the remaining 37 percent.

Now the picture is reversed. State and local taxes add up to only 29 percent of the total, while the federal government takes 71 percent—or $1,389 of the $1,934. Even at that, state and local taxes have tripled since 1939. Federal taxes are 12 times as high.

• RFC Makes Few Disbursements For Minerals

It is a sad commentary on the DMPA-RFC approach to the Defense Production Act and the defense effort that total disbursements by the RFC up to September 15, 1952, aside from the White Pine Copper Company loan, have been less than $500,000 dollars. To be exact, only $465,719.64 has been forthcoming to stimulate domestic production of critical and strategic minerals under Section 302 of the Act. This would not make one good day's work for the Foreign Expansion Division.

• DMEA Has Top-Notch Team

It was cheering to note the Interior Department's press release which reported that at long last C. O. Mittendorf had been promoted from "acting" to actual administrator of the Defense Minerals Exploration Administration. Within the policy limitations laid down for him by Interior and DMPA, and considering the millstones of the U. S. Bureau of Mines and the United States Geological Survey dangling about his neck, Mittendorf has done a splendid job, both technically and organizationally.

More recently, announcement has been made of the appointment of Frank E. Johnson as deputy administrator. Anyone who has done business with Johnson in the days of Metals Reserve Company, and since, will heartily approve.

Mittendorf and Johnson make a team in a government agency which will be greatly appreciated by industry.

• Removal of Price Ceiling Is Discussed

Reports indicate that the NPA and OPS at last are discussing seriously taking the price controls off copper. The opinion of DMPA Administrator Larson for a long time has been that price controls should be removed and he was quoted recently as saying, "The trouble with this whole situation is our foolish domestic price ceiling." That has been only part of the trouble, but the admission will do for the moment.

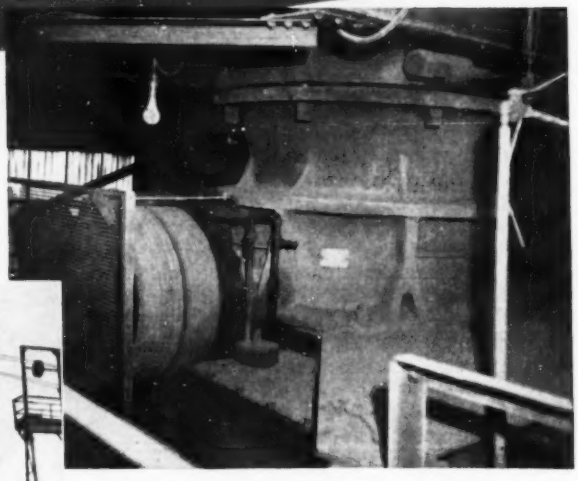
• Tungsten Figures Show Small Results

The results of the government's tungsten program in increasing domestic supplies are quite astonishing. Under the World War II program, domestic production in 1943 was 12,055 short tons of 60 percent WO_3. In 1951, domestic production was 6,214 short tons. The production figures for the first six months of 1952 list domestic production at only 3,397 short tons.

• Paley Report Is Under Fire

Now that some, at least, of the Paley Report has been digested by the mining industry, various critical analyses of its "facts" and figures are being published. It appears that the crystal ball dated 1975, which revealed the future so clearly to the commission's staff and members, was slightly cracked and cloudy in spots.

OVER 3,000,000 TONS HAVE BEEN CRUSHED by this TELSMITH



The 13-B Telsmith Gyratory Crusher is located in the upper part of the 135-ft. steel headframe shown below.

● An important iron ore producer in the Iron River district of the Menominee Range in Michigan finds his Telsmith Gyratory Crusher to be exceptionally economical.

Installed in 1942, this Telsmith 13-B Crusher handles about 35,000 tons of ore per month, and to date has crushed over 3,000,000 tons. Crusher upkeep expense has been exceedingly low, consisting of only one set of eccentric bearings and some very minor parts. For details on Telsmith's bigger capacity and lower upkeep, get Bulletin 271.

Min.-34

SMITH ENGINEERING WORKS, 4034 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Mine & Smelter Supply Co. Denver 17, Colo.
Mines Eng. & Equip. Co. San Francisco 4, Calif.
Lee Redman Equip. Co. Phoenix, Arizona
Garlinghouse Bros. Los Angeles 21, Calif.
General Machinery Co. Spokane 1, Wash.
Clyde Equipment Co. Portland 9, Ore. Seattle 4, Wash.
The Sawtooth Company Boise, Idaho
Gordon Russell, Ltd. Vancouver, B. C.

INTERNATIONAL PANORAMA

WASHINGTON—The Defense Production Administration has revised its tungsten ore goal upwards for 1954. The new goal calls for 40,000,000 pounds of contained tungsten from all sources compared to an earlier goal of 34,000,000 pounds.

ANKARA—Turkish prospectors for chrome have more than doubled in number. Applications for mining permits in 1950 were 4,280 and in the first six months of 1952 were 8,290.

JOHANNESBURG—South Africa's first byproduct uranium plant has been placed in operation. The plant costing more than $4,000,000 will treat gold tailing at the West Rand Consolidated Mines, Ltd.

RIO DE JANEIRO—Production of high-grade iron ore during July at the Itabari mines of the Companhia Vale do Rio Dôce was at an all-time peak rate. A total of 169,869 tons were mined and 151,789 tons were exported.

WALLACE, IDAHO—Shortage of electric power has caused curtailment of electrolytic zinc refining operations by Sullivan Mining Company. Production loss may be 1,000 tons per month for several months.

LISBON—Beralt Tin and Wolfram Limited has signed a contract for sale of 2,500 long tons of tungsten (wolframite) concentrate to the United States government. The contract calls for deliveries for five years beginning from October 1, 1952.

GALENA, KANSAS—The Eagle Picher Company will construct a $4,000,000 zinc concentrate roasting and sulfuric acid plant here. When completed in 1954, the new facility will produce about 240 tons per day of sulfuric acid.

BUTTE, MONTANA—The United States Steel Company has taken an assignment of a 99-year lease on 11 fluorspar claims southeast of Darby, Montana. Shipments of metallurgical fluorspar are being made to the Geneva, Utah, steel plant.

TOKYO—Production of electrolytic copper in Japan during August was 7,825 metric tons. This is the lowest monthly output for 1952.

PITTSBURGH—Production of steel in the United States during the third week of September was the greatest in history—2,160,000 tons of ingots and castings.

FALLON, NEVADA—The Kaiser Aluminum & Chemical Corporation has begun operation of its new fluorspar flotation mill here. Acid-grade concentrate will be shipped to Pittsburg, California, where it will be converted to aluminum fluoride.

WASHINGTON—Fourth quarter 1952 allocations of copper, nickel, and cobalt by the International Materials Conference are larger than for the third quarter. Greatest increase is in cobalt where 2,890 metric tons are allocated compared to 2,475.

LA PAZ, BOLIVIA—The Bolivian government has set up a new agency, the Mining Corporation of Bolivia, for the production and export of tin and ther metals.

CLEVELAND—The Pittsburgh Steamship Division of the United States Steel Corporation continued to break all Great Lakes iron ore shipping records in September. In one week 64 ships loaded 1,002,092 gross tons of ore. August shipments by the division were also a record, 3,974,477 gross tons.

NEW ORLEANS—Kaiser Aluminum & Chemical Corporation has placed the third of eight potlines in operation at its Chalmette refinery. Annual aluminum output from the line will be 50,000,000 pounds.

SUDBURY, ONTARIO—Two Canadian nickel companies have pooled facilities to increase output of nickel for sale to the United States' Defense Materials Procurement Agency. East Rim Nickel Mines, Limited will mine 3,500 tons of ore monthly and Falconbridge Nickel Mines, Limited will process it.

WELKOM, ORANGE FREE STATE—A large flow of water estimated at 1,400 gallons per minute has flooded the No. 2 shaft of the Free State Geduld Mines Limited here. Water rose 20 feet per hour in the 5,600 foot deep shaft.

WASHINGTON—The Defense Production Administration has announced that expansion goals and requirements for antimony, cadmium, and mercury have been met.

PITTSBURGH—The Defense Production Administration has called for a third round of aluminum expansion. It has asked for plant expansion to produce an additional 200,000 tons per year. Total expansion called for since the start of the Korean war is 670,000 annual tons. This would give United States an annual capacity of 1,700,000 tons.

CONAKRY, FRENCH GUINEA—The first shipment of bauxite has been made to Canada from Kassa Island by Bauxites du Midi. Annual shipments of 250,000 tons are planned to Aluminum, Ltd.'s Arvida, Quebec, refinery.

WASHINGTON—The Defense Production Administration has established expansion goals for beryl and barite. The goal for beryl output in 1955 is 9,000 short tons—about 4,200 short tons more than 1951 output. Barite production is to be increased to 1,360,000 short annual tons in 1955 from the 900,000 in 1951.

MEXICO CITY—The Mexican government has awarded a sulphur mining concession on Socorro Island, 369 miles off the Northwest coast of Mexico, to two Mexican citizens. Production of 200 tons of refined sulphur daily from the 95 percent ore is scheduled within a year.

MELBOURNE—The Australian government has raised the price ceiling of copper produced in Australia £65 per ton to £A350.

SANTIAGO—Production of iron ore from the Romeral deposit in Coquimbo province has begun.

Claims Court To Hear Gold Mines Case in January

Counsel for the government and counsel for all 16 gold mining company claimants who are seeking damages because of the World War II WPB order L-208 met in Washington, D.C. in October. The meeting was presided over by commissioner William Day of the United States Court of Claims.

Those present reached an agreement that the court would begin to take testimony, hear witnesses, etc., starting on January 26, 1953. It thus appears that the earliest decision the Court can make will be sometime next summer.

The Judges of the Court of Claims ruled earlier this year that three gold mining companies had the right to sue the government for damages incurred as a result of forced war-time closing of their mines. Congress later passed S. 3195 which waived the Statute of Limitations to permit other gold miners to file similar suits.

RFC Buys Accumulated Tin Concentrates from Bolivia

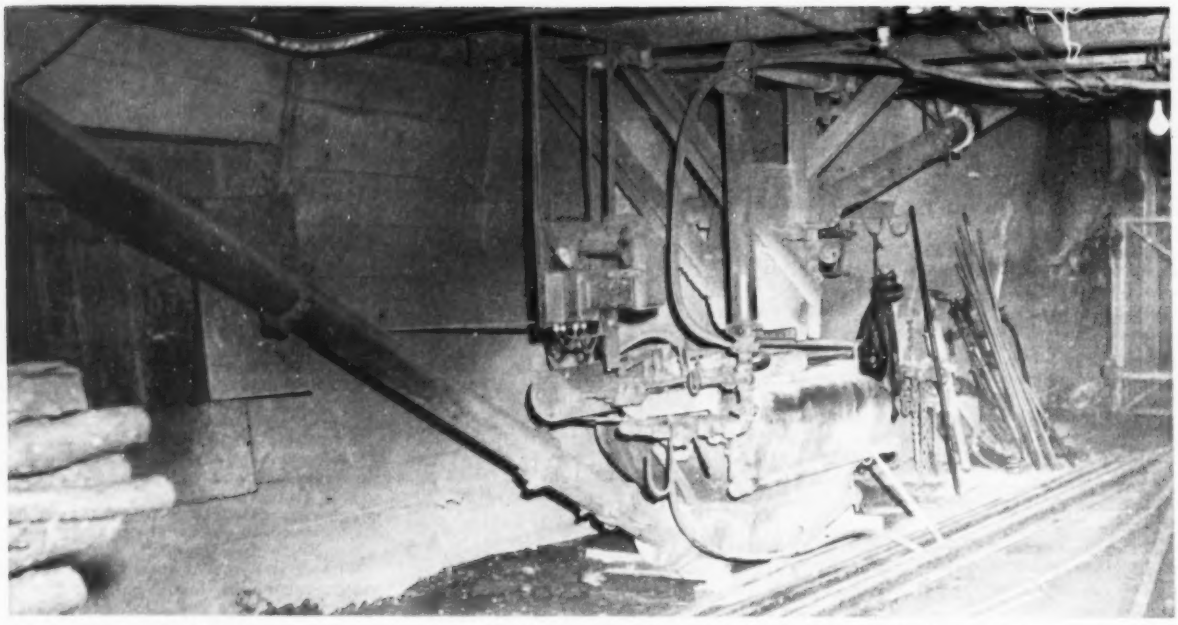
An agreement has been reached between the United States Reconstruction Finance Corporation and the Banco Minero de Bolivia (government bank) for the sale to the RFC of the present accumulation of Bolivian tin concentrates. This is estimated to be between 6,000 and 7,000 long tons of contained tin. The concentrates were sold by Banco Minero through its agent, the Mercantile Metal & Ore Corporation of New York, at a base price of $1.17½ per pound f.o.b. South American ports.

First Bauxite Shipments From French West Africa

The first shipment of bauxite ore from an important new source in French West Africa arrived in Canada last month. Aluminium, Ltd. of Canada received 9,800 tons of bauxite from its new 250,000-ton-per-year plant on the island of Kassa off the coast of French Guiana.

The plant is owned and operated by Tauxite du Midi, a French subsidiary of Aluminium, Ltd., which has been surveyng bauxite potentialities in French West Africa since the early 1920's. The Canadian firm employs more than 1,200 people at this plant and in 1950 alone invested over $2,000,000 to construct bauxite mining, drying, and shipping facilities. Construction began in 1949.

Company officials stated that the main sources of bauxite will continue to be Brazil, Jamaica, and British Guiana, but that this new plant will be a significant source of the strategic ore for Aluminum Company of Canada, its main subsidiary.



This Pressed & Welded Product Company's pneumatic concrete placer is located on the sixth level of Cleveland-Cliffs' Mather "B" iron mine 2,200 feet underground. Surface-mixed concrete enters through the diagonal pipe at upper right and is discharged through the pipe on the left which leads to the forms 2,300 feet away.

CONCRETING AT MATHER "B" MINE

The Cleveland-Cliffs Iron Company mixes concrete on surface and pumps it 4,800 feet underground for lining of slusher drifts and draw holes

Cleveland-Cliffs Iron Company is successfully mixing concrete on the surface at the Mather "B" mine at Ishpeming, Michigan and pumping it hundreds of feet down the shaft, through the sixth level, to its position behind slusher drift forms.

The town of Ishpeming is located on Michigan's Upper Peninsula and in the heart of what was at one time known as the "Great North Woods." Although the virgin woodlands have long ago been depleted, there are still thousands of acres of timber of sufficient size to be called mine timber in the immediate area. Why then, with these timber areas adjacent to the mine and readily available, does Cleveland-Cliffs turn to concrete for supporting slusher drifts.

Concrete Replaces Timber

Due to the height and nature of the ore body at the Mather "B" mine, block caving is the most economical form of ore recovery. With blocks of ore as great as 200 feet in height above the drift, it was necessary to find some supporting material that would withstand the terrific strain and shocks caused by pressure of the caving ore and blasting vibrations.

Support was originally by timber. In the words of supervisory personnel at "B" shaft: "The drifts were literally filled with timber that averaged 16 inches in diameter. By the time half the ore in a given block was removed, repair and maintenance work on the timber became excessive; while the concrete drift-lining holds up for the full time required to cave the entire block."

Pneumatic Placers

Although Cleveland-Cliffs engineers at "B" shaft recognized the advantages in concrete lining of drifts, the problem of placing concrete at a distance of nearly a mile from the surface plant was almost unsurmountable. Finally, it was decided to use three ¾-yard-capacity pneumatic placers in tandem. These units are constructed by Pressed & Welded Product Company. Subsequent experience with these placers showed management that only two were required for moving the concrete more than a distance of 4,800 feet from the mixer to the slusher drift where it was to be placed.

Concrete for drift lining is mixed in a separate plant similar to any present day, ready-mixed, concrete batch plant. Bins and weigh-hoppers were designed and constructed by personnel of the "B" shaft.

Regular portland cement is used for this concrete with some pozzolith employed as an admixture. Natural sand and gravel, obtained locally, is used in the concrete mix. The weigh-batcher, of one-yard capacity, discharges directly into a two-cubic-yard-capacity Rex mixer. The mixer is stationed under the ag-

gregate hoppers on a platform approximately four feet above ground level. When not mixing concrete for the drift lining, this mixer may be mounted on a truck to haul concrete to other surface areas of the mine as a ready-mix concrete unit.

Pumped 4,800 Feet

Concrete is discharged from the surface mixing plant directly into the first placer which moves it approximately 300 feet horizontally on the surface to the collar of the shaft and roughly 2,200 feet vertically down to the sixth level. Here the second placer provides the required boost to move the concrete 2,300 feet to the drift forms. Total time required to transport a ¾-cubic-yard batch of concrete a total distance of 4,800 feet is 4½ minutes. Both placers are of ¾-cubic-yard capacity.

Collapsible Steel Forms

Minimum thickness of concrete drift lining at the Mather "B" is one foot, no reinforcing bars are used. Only forms of reinforcing used in the slusher drift concreting are two four-inch, 13-pound, H-beams imbedded in the brow of each mill hole or finger raise to protect the concrete from chunks falling during blasting operations.

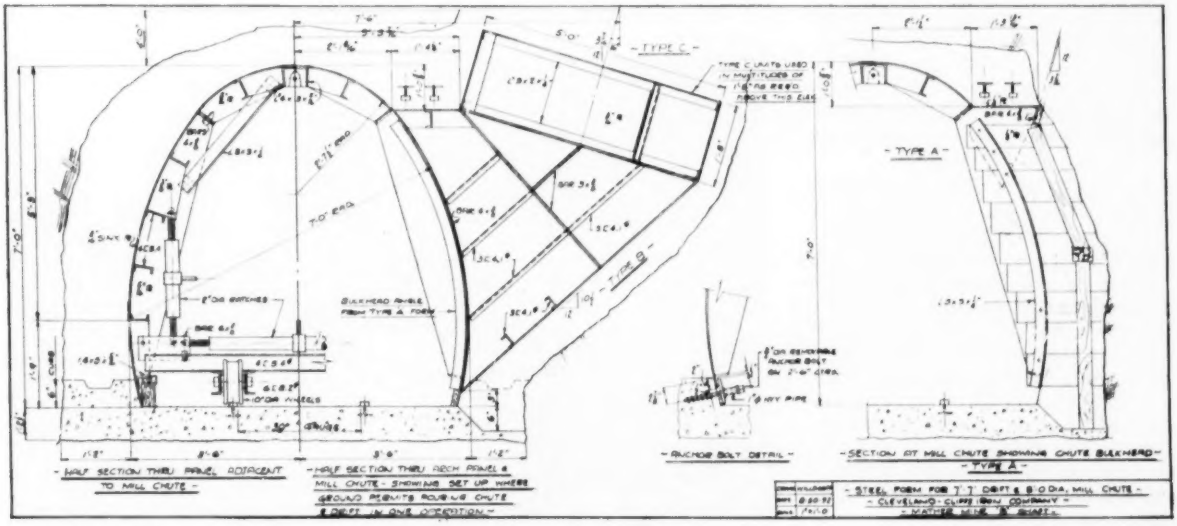
Collapsible steel forms are used to hold and shape the concrete in the drifts. These forms were furnished by Blaw-Knox Company from designs drawn by the "B" shaft's engineering department. The finished, concreted drift is elliptical in shape with the bottom cut off for the poured-in-place floor. It is seven feet wide at the sill and seven feet high along the center line. In concreting a slusher drift, the floor is poured first with a slightly raised curb on each wall formed with a key-way and projecting dowels to make a bond with the walls. Steel forms are erected in the drift after the floor sets, and concrete is pumped in between the drift wall and forms.

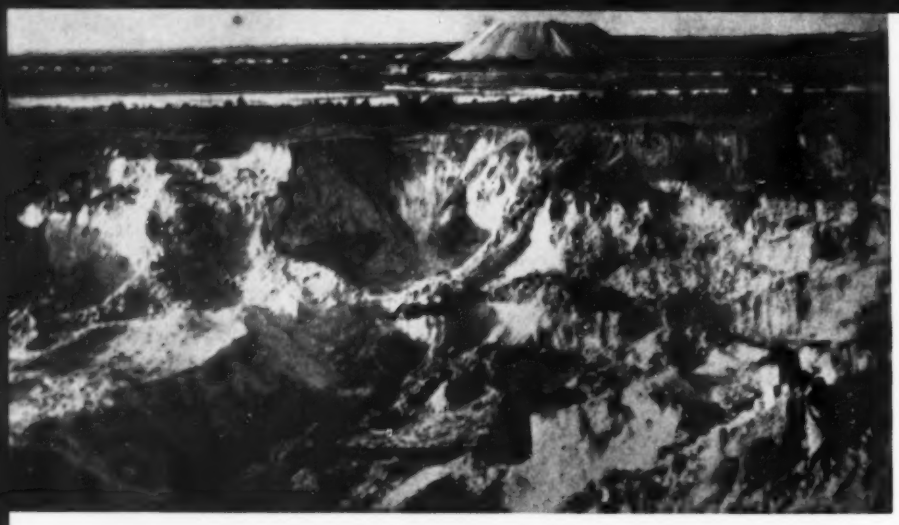
A completed section of the concrete slusher drift. Miners are in the draw points. Note the sections of the steel forms in the background and at right.

Pour 18 Feet Daily

Each form section is five feet in length and 20-foot sections are placed at one time, using four sets of forms. Each of the four sets of forms is composed of two parts, each forming half the wall from the top center line to the floor. Since two feet of overlap is allowed for each new section of concreted drift, net advance is 18 feet for each set-up of these forms. Concreting is completed one day and the forms stripped and and moved the next morning.

Mill holes or finger raises are spaced on each side of the drift directly opposite each other on 20-foot centers. The finished draw points are beautiful examples of concrete engineering. They start from the side of the elliptical drift as a square opening and at seven feet above floor elevation make a circular section.


- TYPE C -
- TYPE A -
- TYPE B -
- HALF SECTION THRU PANEL ADJACENT TO MILL CHUTE -
- HALF SECTION THRU ARCH PANEL & MILL CHUTE - SHOWING SET UP WHERE GROUND REQUIRE ROUNDING CHUTE & DEPT. IN ONE OPERATION -
- ANCHOR BOLT DETAIL -
- SECTION AT MILL CHUTE SHOWING CHUTE BULKHEAD -
- TYPE A -
- STEEL FORM FOR 7' 7" DEPT & 8'-0 DIA. MILL CHUTE -
- CLEVELAND-CLIFFS IRON COMPANY -
- MATHER MINE & PLANT -



A typical "soft pegmatite", open-pit mine at Manono, Belgian Congo. In the background is a washing plant tailing pond from another open pit.

HOW GEOMINES WILL TREAT 24,000 TONS OF "HARD" TIN ORE PER DAY

This is the first of a series of articles written by Mr. Lyons describing mining and metallurgical practices at some of the largest African mines, mills, and smelters. Data on plant operations were collected by him during a six-month, 15,000-mile automobile trip in 1951 and early 1952. He and his wife took the trip while on leave from his position as smelter superintendent for the copper smelter and electrolytic refinery of the Electrolytic Refining & Smelting Company of Australia Proprietary Ltd., Port Kembla, New South Wales, Australia. He is also a part-time lecturer in nonferrous poduction metallury at Wollongong Branch of Sydney Technical College. The photographs used with this article were taken by Mr. Lyons who is an associate of the Royal Photographic Society of Great Britain.

The current expansion of "hard pegmatite" mining and washing plant construction by GEOMINES (Compagnie Geologique et Miniere des Ingenieurs et Industriels Belges) at Manono, Belgian Congo will make this the world's largest open-pit tin lode mining operation when completed in 1953. Plans call for the mining and washing of 24,000 tons per day of low-grade primary pegmatite, from which 10,000 tons of metallic tin and important amounts of tantalite and columbite will be recovered each year.

GEOMINES will be an important tin producer for many years as reserves have been reported large enough to last for 50 years of mining.

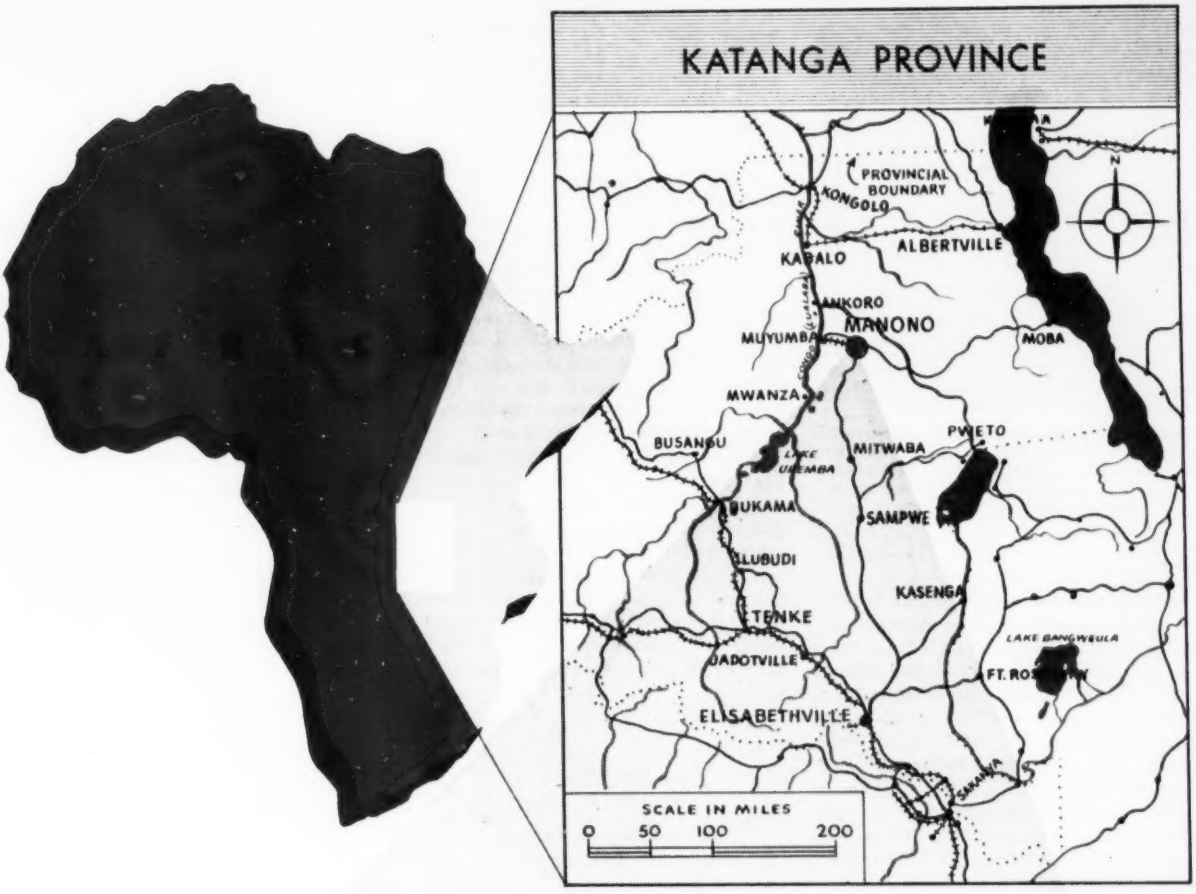
Cassiterite has been known in the area since 1912 and early production came from sluicing. Since 1933, the softer, kaolinized, near-surface "soft pegmatites" have been mined and washed. Since 1946, exploration by drilling below the soft ores at Kitotolo disclosed the existence of continuous primary ore of higher grade than the near-surface ores. This was of great significance as the harder ore is much more difficult and costly to mine and wash; in addition, it has arsenic as an impurity which complicates tin smelting.

Six small washing plants (Louviere de l'est) were in operation during the time of my visit in late 1951 treating "soft pegmatite" from the Manono or easternmost pegmatite. A flow sheet of one of these is given. As the ore is depleted, these plants will become obsolete, and increased production is scheduled from the westernmost Kitotolo pegmatite.

Geology and Mineralogy

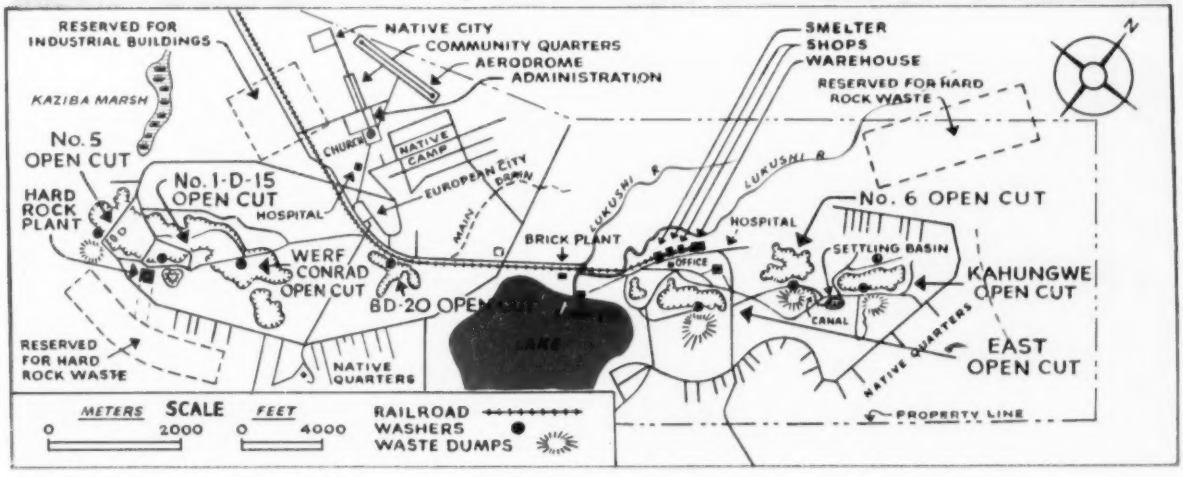
Country rock of the district is a bright, grayish schist with a steep dip. Within the schist are lenses of clear-to-dark quartzite, sometimes

The "soft pegmatite" is dug by the large electric shovel at left and loaded onto the belt conveyor by the smaller shovel at right. Ore is elevated to the washing plant on the pit rim by the belt conveyor shown in the foreground.



THE OPEN PIT TIN MINES, WASHING PLANTS AND CAMP of Geomines

MANONO, BELGIAN CONGO, AFRICA



Loading tin ingots on a truck for transportation to the Lualaba (Upper Congo) River. The tin ingots are handled many times before they reach the seaports for final shipment to Belgium and the United States.

banded and hematitic, of the lower Kibara formation. Two laccolithic pegmatite bodies are found in the schist separated by about two miles of schist and granite. Each pegmatite has a general N.50°E. strike, and both are about 3½ miles long and from 150 to 2,500 feet wide. The westernmost pegmatite (Kitotolo) crops out over an area of about 1,450,000 square yards, and the easternmost (Manono) crops out over a 1,300,000-square-yard area.

Cassiterite (SnO_2) is the principal tin mineral and is disseminated almost homogeneously in the primary rock (4.5 to 5.5 pounds of tin per cubic yard). Grade is fairly uniform to a depth of 350 feet, at least. The cassiterite is found as small, black, flattened grains. A typical screen analysis of cassiterite is: Plus-10-mesh, 23.40 percent; minus-10 and plus-28, 27.90; minus-28 and plus-35, 11.60; minus-35 and plus-48, 13.10; minus-100 and plus-200, 9.40; and minus-200-mesh, 3.00 percent. In the Manono "hardrock" pegmatite, the cassiterite is not associated exclusively with the quartz, spodumene, nor in the books of mica. No tin-bearing quartz veins have been observed. Thoreaulite ($SnTa_2O_7$) has been estimated to be about five percent of the cassiterite content. Analyses of specimens, considered to be Thoreaulite, from the northern part of the Manono deposit showed as much as 17 percent Cb_2O_5. Loellingite ($FeAs_2$) is found in the primary rock and its arsenic content has caused trouble in smelting as described below. Spodumene ($LiAlSi_2O_6$) is an important constituent of the pegmatite and plans have been considered for production of lithium from it. Moisture content of the ores varies with the pit and with the season of the year. The softer ores from Kitotolo contain up to 12 percent water in the wet season and average about 6.0 percent. "Hard pegmatite" ore carries from one to three percent water.

TABLE NO. 1

GEOMINES Production of Cassiterite and Metallic Tin From 1938 to 1951

Fiscal Year Ended June 30	*Cassiterite (Metric Tons)*	*Metallic Tin (Metric Tons)*
1938-1939	3,000	2,158
1939-1940	3,772	2,753
1940-1941	5,056	3,691
1941-1942	4,860	3,543
1942-1943	4,651	3,395
1943-1944	4,436	3,238
1944-1945	4,414	3,090
1945-1946	3,770	2,639
1946-1947	3,233	2,263
1947-1948	4,050	2,835
1948-1949	5,200	3,640
1949-1950	4,650	3,250
1950-1951	3,820	2,670

Pictured at Manono outside the "hard pegmatite" washing plant are LEFT: E. Claeys, concentrator superintendent, and RIGHT: Andre Brunee, washing plant foreman.

"Hard Pegmatite" Mining

The primary pegmatite (Manono) is mined from an open pit in which a series of 75-foot-high benches have been developed. The hard rock is drilled with Bucyrus-Erie 29T and 42T electrically powered churn drills, with six- and nine-inch-diameter bits. Drilling has been a problem, but the use of nichrome steel bits has proven to be advantageous. Bits are resharpened after 375 to 450 feet of drilling. United States engineers have visited the mine to advise as to methods for improving drilling performance. Holes are bottomed five feet below grade, and are spaced 12 to 16-feet apart, 13 feet back of the top of the bank. About 1 to 1½ pounds of high-explosive gelignite powder per cubic yard is required for primary breakage. Holes are loaded with split charges with two-thirds of the powder below the intermediate stemming and one-third above. Primacord is used for detonation. The Societe Africaine d'Explosifs (Afridix) has a powder plant at Manono producing about 70 tons of powder per month for use in the "hard pegmatite" open pit. Secondary blasting is important as the rock breaks in coarse fragments which

LEFT: A general view of the Kitotolo, "hard pegmatite", open-pit tin mine of Geomines. Expansion of hard pegmatite mining is underway as the softer, near-surface, weathered pegmatites are depleted. RIGHT: This is one of the older washing plants, "Laverie de l'est", treating soft pegmatite. The flow sheet with this article is the one used by this washery.

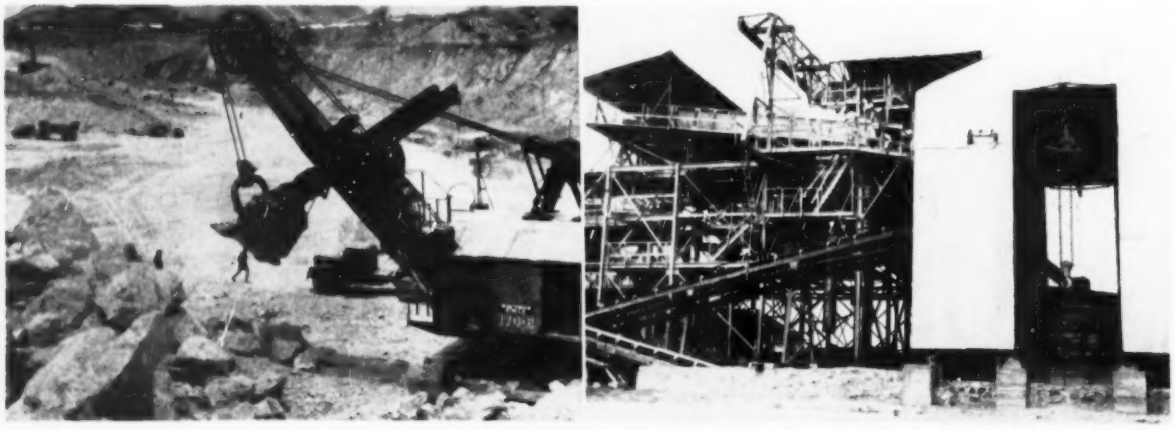


TABLE NO. II

Typical Percentage Analyses of GEOMINES' Manono "Hard Pegmatite" plant Concentrates

Constituents	*Example A Percent*	*Example B Percent*
Tin	71.20	70.10
Arsenic	0.87	1.17
Fe_2O_3	2.38	2.15
Tantalum-columbium oxides	1.79	2.85

must be block-holed with Atlas and Ingersoll-Rand jackhammers using Coromant (tungsten carbide tipped) steel. By working a long pit face this secondary blasting does not interfere with normal loading operations.

Broken ore is loaded by three, Bucyrus-Erie, 6½-cubic-yard, 170-B, electric-powered shovels. GEOMINES was the first company in the Belgian Congo to use this type of shovel, but the Union Minière du Haut-Katanga is now using similar equipment. The ore is loaded into 20-ton, Easton, side-dumping, Diesel-powered, semi-trailers and hauled to the primary bin excavated in the pit's bank. A Symons cone crusher powered by a 155-hp. electric motor and set below the rock bin crushes the ore to minus-4-inches. Crusher discharge is elevated to the 150-cubic-yard-capacity mill bin on the pit's southern bank by a 700-foot-long, 34-inch-wide belt conveyor.

The ore is grizzlied with the minus-2-inch fraction dropping to a belt conveyor and the plus-2-inch portion to two Symons cone crushers. The minus-2-inch ore is stored in six all-steel ore bins each of which has a 1,200-short-ton capacity.

Crush and Rod Mill

The recently constructed crushing plant is well-engineered, has steel framework, and is covered by corrugated aluminum sheeting which was cheaper, easier to obtain in the Congo, and has the further advantage of greater heat reflectivity than galvanized iron sheeting.

Ore from the six bins is screened over six Symons rod deck screens. The plus-⅜-inch portion going to six Symons short head crushers. Crusher discharge (minus-¼-inch) is returned to the six storage bins. Undersize (minus-⅜-inch) from the primary rod deck screens goes to six secondary rod deck screens. All minus-⅛-inch ore goes to the washing plant and the plus-⅛-inch portion to dry grinding in 11 by 9.5 foot Nordberg rod mills. Rod mill undersize is sent to the washing plant.

TABLE NO. III

Typical Percentage Analyses of GEOMINES' High-Grade, Tantalite-Columbite Concentrate

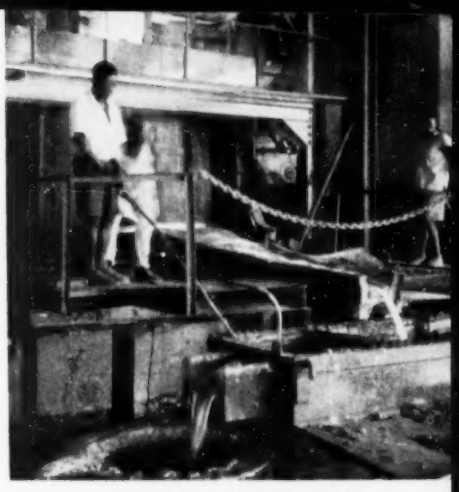
Constituent	*Example A Percent*	*Example B Percent*
Ta_2O_5	30.94	41.49
Cb_2O_5	35.29	32.37
Sn	1.91	2.22
TiO_2	1.60	0.70

Gravity Concentration

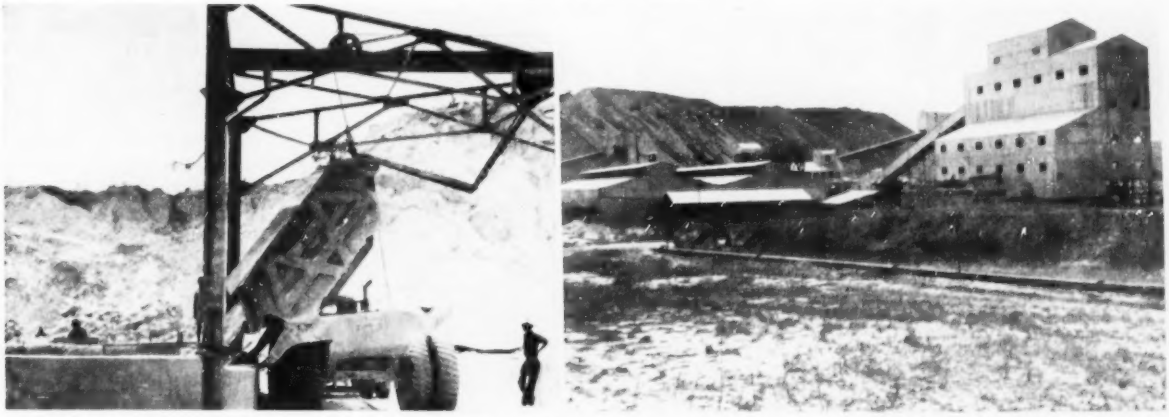
Separation of the tin-tantalite-columbite minerals from the pegmatite rock is done by gravity concentration methods as the specific gravity of the concentrate is about 7.3 and that for the rock is between 2.6 and 2.7.

Primary concentration is by jigging in one of the six units. Each unit has a 900-short-ton capacity, all-steel, fine ore storage bin and 18 24 by 36 inch Denver jigs. The primary jig concentrate is retreated by three 24 by 36 inch Denver jigs to produce a final concentrate and a low-grade concentrate for further treatment. Primary jig tailing is passed over a 4 by 12 foot Symons screen with 12-mesh openings and the oversize discarded. The undersize plus the low-grade concentrate from the cleaner jigs is treated in a 50-foot-diameter hydroclassifier. Overflow is pumped to the head of the primary jig circuit for dilution water. Hydroclassifier underflow is pumped by four 6-inch duplex diaphragm pumps and one 10 by 8-inch Denver pump to 40 Deister tables. The tables make a finished concentrate, a middling concentrate which is recirculated, and a tailing. The tailing is decanted; the undersize goes to the tailing pile and the overflow water is reused for jigging.

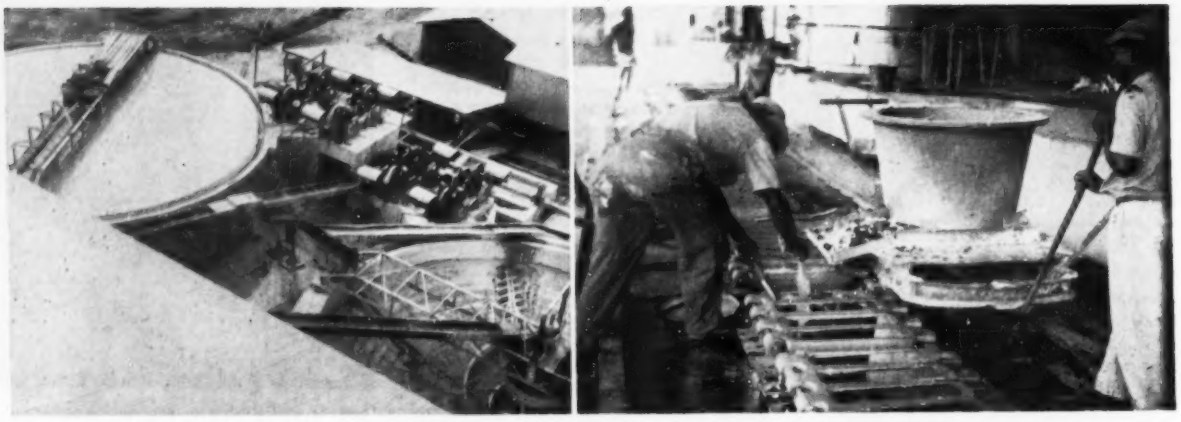
Typical analyses of concentrate from the "hard pegmatite" plant are shown in Table No. II. Most of this concentrate is shipped to Belgium for refining, and some to the United



Tapping molten tin from the electric smelting furnace



LEFT: A fixed hoist is used to dump the 20-ton, Easton-body, side-dumping, Diesel-powered, semi-trailer truck into the coarse ore bin cut into the solid rock of the pit bottom. A 30-inch Symons cone crusher is set below the bin. The crushed ore is elevated to the washing plant on the pit bank by a 36-inch-wide belt conveyor. RIGHT: a view of one of the new, "hard pegmatite," gravity concentration plants. Aluminum corrugated sheets on a steel frame make a light cool building. In addition to the tin concentrate, a tantalite-columbite concentrate is also made. The large tailing pile in the background has a high spodumene content and could be an important source of lithium. Increased availability of electric power is necessary to produce lithium.



LEFT: The hydroclassifiers outside the jig-table building of the washing plant. RIGHT: Africans casting high-purity tin ingots.

States. Laboratory testing has been underway to develop a process for use at Manono based on the roasting off of arsenic, followed by magnetic separation of the tantalum-columbite oxides, and iron oxides as is now done with the low arsenic concentrate.

Tantalite-Columbite Recovery

Concentrates from the "hard" and "soft" rock washing plants are sent to a small cleaning plant near the smelter at Manono. They are separated into three fractions. The coarsest fraction is rejigged and the two smaller sizes washed on vibrating tables. The jig and table concentrates are then sun-dried in dry season or during the wet season in an oil-fired rotary drier. The tantalite-columbite oxides are removed from the dried concentrate by magmatic separation, as is the high iron portion.

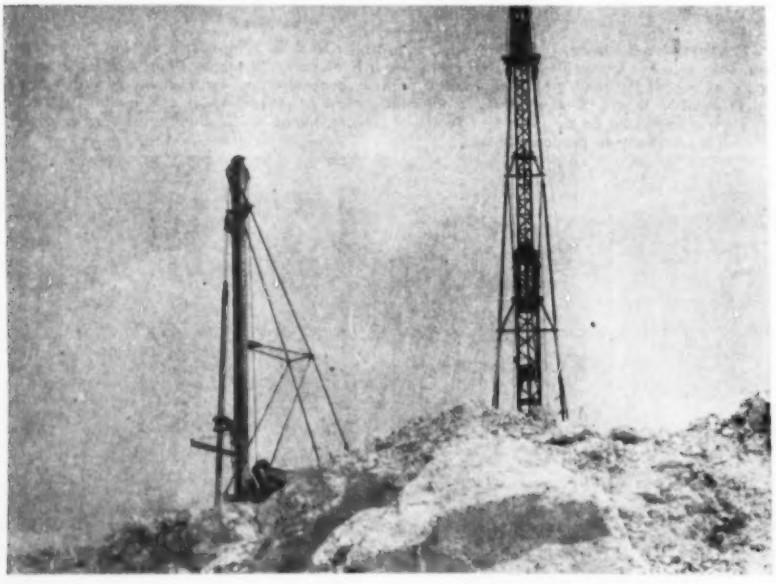
TABLE NO. IV

Typical Percentage Analyses of Refined Tin, "Rich Slag," Final Slag, and "Hardhead" at GEOMINES' Manono (Belgian Congo) Electrolytic Tin Refinery

Constituent	*Refined Tin Percent*	*Rich Slag Percent*	*Final Slag Percent*	*Hardhead Percent*
Tin	99.3	23.9	2.4	50 to 60*
Feo	—	25.1	13.7	—
CaO	—	2.2	12.9	—
Insoluble ..	—	35.5	69.6	—
Iron	0.013	—	—	—
Lead	0.005	—	—	—
Copper ...	0.0084	—	—	—
Sulphur** .	0.0015	—	—	—

* Widely variable. ** From charcoal.

The "hard pegmatite" breaks in large fragments requiring much secondary blasting. Two churn drills on the bank are drilling blast holes.



About 65 to 75 percent of the tantalite-columbite oxide is recovered in a concentrate of the grade shown in Table No. III. The remaining portion remains in the final slag from tin smelting and is shipped to the United States for further refining.

Electrolytic Smelting

The dried, low arsenic, tin concentrate (mostly from Kitotolo) is smelted with purchased concentrates (principally from Ruanda-Urundi now, but during World War II from other Congo mines) in a three-phase, 1,000-kva Siemens electric furnace. Capacity is about 1,000 tons of concentrate monthly, but recent production has been only about 350 tons. Mine production of low arsenic concentrate from the Kitotolo "soft rock" mine is the limiting factor.

Smelting of the carefully weighed and mixed charge is designed to obtain a pure tin and "rich" slag. The "rich" slag is stockpiled for two months and then retreated in a smaller (B.B.C. 850 kva) furnace. This yields "hardhead" which is resmelted with the cassiterite concentrates.

Tin from the first smelting (about 97.0 percent Sn) is liquidated at 300° C. on electric "tables" (sloping hearths). These are two inclined tables, sloping at about 16° toward a center trough, which are heated by electricity passing through a grid of high resistance wire. Each table holds two one-ton tin slabs. The liquidated tin (99.3 percent Sn) is collected in a Seigers furnace which holds 13 tons of molten tin. There it is blown for two to three hours at 400° C. After blowing, pig tin is cast in molds which are emptied by Africans.

Smelting details follow: Charge is 2,200 pounds of cassiterite concentrate, 13.2 pounds lime (burned at Manono), 440 pounds of "hardhead",

220 pounds of tin-bearing scrap, and 21 cubic feet of charcoal. Electrode consumption is 3.8 pounds per ton of concentrate. Fume loss of tin is 0.1 percent, and other losses are about 0.1 percent also. The eight-foot-deep furnace is tapped about every $2\frac{1}{2}$ hours.

Water-Electric Power

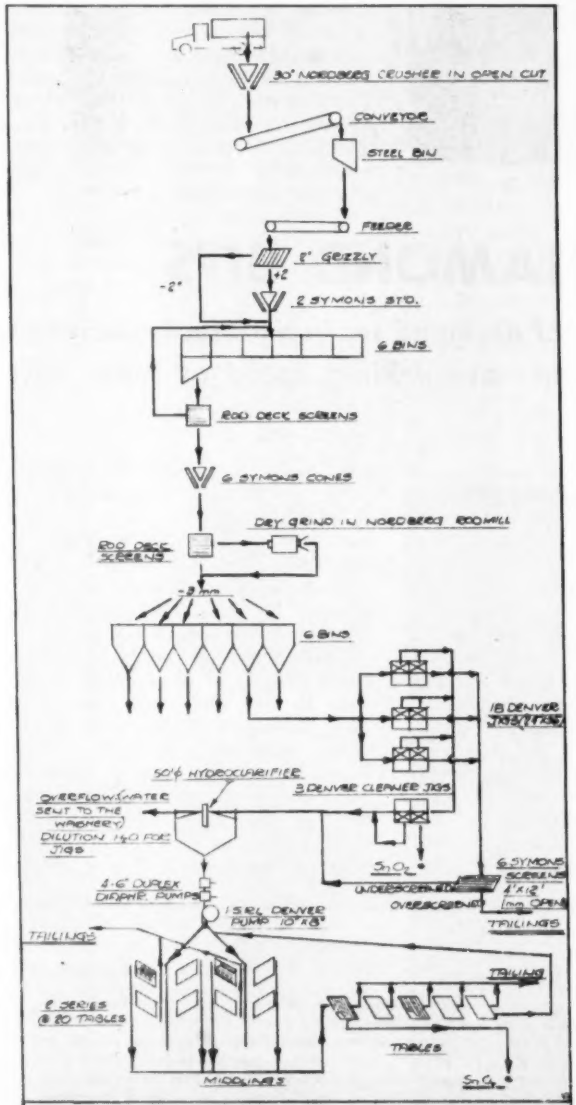
During the dry season, water for the washing plants is pumped from Lake Lukushi, an artificial lake impounded by damming the Lukushi and Luninga rivers. The company operates its own hydroelectric plant at Piana-Mwanga Falls on the Luvua River. This plant generates about 52,000,000 kwhr. of electricity per year from three generators with a combined capacity of 15,000 hp.

Future Operations

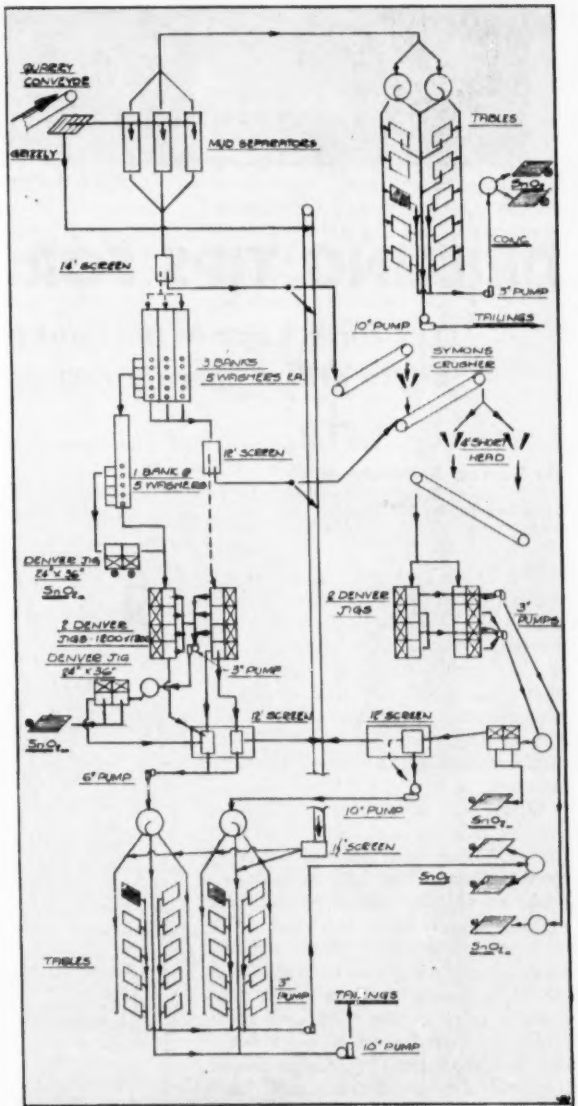
Plans have been made and actual construction is under way to increase production of "hard pegmatite" to 24,000 tons per day. Estimated annual metallic tin output at this rate of mining would be 10,000 tons.

At the increased mining rate, a total of 10 electric shovels will be required. The primary crusher in the pit floor has proven to be underpowered and two larger crushers, each driven by 325-hp. electric motors, will be used. To prevent crusher choking, a revolving chain grizzley will be installed ahead of each crusher. A new and longer conveyor belt will be installed in the pit to serve the new crusher and to shorten the truck haul. The 48-inch-wide belt will use nylon cords, and will be about 10,000 feet long. Excessive rod wear occurred in the rod mills with end feeding so the new units are to be equipped for center feeding.

The plant has successfully recovered 90 percent of the cassiterite so that the enlarged plant will have no major flowsheet changes. Additional units, similar to the equipment now used, will be added to increase capacity.



FLOWSHEET OF 'HARD PEGMATITE' WASHING PLANT OF GÉOMINES AT KITOTOLO, BELGIAN CONGO



FLOWSHEET OF LAVERIE NO VI 'SOFT PEGMATITE' TIN WASHING PLANT OF GÉOMINES AT MANONO, BELGIAN CONGO

Diamond drilling in the Treasury Tunnel of the Idarado Mining Company, Ouray County, Colorado.

Christensen Diamond Products Co. Photograph

DRILLING TIPS FOR DIAMOND BITS

The correct size of the right type of diamond set in a properly designed bit to drill a specific rock will increase drilling speed at lower cost

By Burton J. Westman

Consulting mining geologist
Aloha, Oregon

Rotary drilling with abrasives is probably the oldest method of boring known. The Egyptians used this method to bore true holes through the Pyramids from the vaults beneath, so positioned that a known astronomical observation is visible but once a year. The actual drilling method the Egyptians used is still a mystery.

What was below the surface of the earth has been a quest of man for centuries, and the mining fraternity always has had its own big problem making holes, particularly making them deep and fast. The first step over slow hand drilling was made during the boring of the Mt. Cenis tunnel between Italy and France during the 1860's. Robert Leschott, a Swiss engineer, reflecting on how the Egyptians bored through the Pyramids, and how jewelers were boring small holes through precious stones, developed a column-mounted, hand-operated gear device to rotate a hollow rod tipped with a hand-set diamond bit. This was an immediate success, and the headings on both sides were advanced rapidly from then on. During this same time on the Mother Lode in California, one reference is made to a similar operation with diamond-tipped rods. Little came of the latter, however, because it wasn't until the 1880's that the diamond drill as we know it was brought to the United States for exploration work in the Tri-State region.

Diamond drilling for cores continued, but using it for blast hole drilling was superceded by the steam, then the air percussion drill.

In the 1930's blast hole drilling was again resurrected experimentally in Europe (particularly in Sweden), perfected, and brought back across the Atlantic where it has been used extensively in the United States and Canada up to the present for long hole blasting in mining and construction.

Until about 10 years ago, diamond drilling of blast holes deeper than 18 feet was more economical than percussion drilling with pneumatic hammers; however, since World War II, the rise in diamond cost has brought about the development of long blast hole pneumatic drilling using carbide bits, which, in some mining districts, notably Howe

About the Author

Born in the Iron River mining district at Stambaugh, Michigan, the author became interested in diamond drilling as a youth. Since then he has had a wide variety of experience in drilling, equipment design and drilling application. His greatest interest in core drilling is in the factors involved in core loss, which resulted in his discovery of the "calyx packing" phenomenon among other overlooked causes. The author also believes that diamond drilling can be applied to large diameter bore holes for rapid shaft sinking and is currently developing material for a paper on this subject.

Mr. Westman is a graduate of Michigan State College and a World War II veteran. He is a consulting mining geologist with headquarters at Aloha, Oregon.

Sound Mining Company's Holden, Washington, mine has now superceded diamond drilling.

Drilling Large Holes

The need for both large and very deep holes during the past two decades in the construction and mining fields has lead to several developments. The use of diamonds here was bypassed by other methods. Reaming pilot churn drill holes out to 30 and 48 inches has been done down to 500 feet, but the greatest development was with calyx equipment. This method, using chilled steel shot as the cutting medium, has been used to bore up to 66-inch diameter holes to 1,208- and 2,487-foot depths. The slowness of penetration of this latter method has resulted in excessive labor cost, so at present, there is some investigation into the possible use of diamonds to speed up the penetration. At present one 48-inch diamond drilling program is contemplated for 1952 on an experimental basis. The largest diamond drill holes to date are two 38-foot horizontal bores drilled by Canadian Longyear Ltd. on the Isle Maligne dam construction.

Holes By "Structural Drilling"

Another method is an old one used long before the turn of this century. It is called jetting or wash boring. Much of this was done in the Lake Superior Region between 1880 and 1900 to probe for iron ore beneath the thick glacial overburden. This method employs only water conducted down through a small wash pipe, which is churned up and down through pipe casing, and the broken material is washed to the surface. Since 1930 this method has been improved on the Mesabi Iron Range, and is now termed "structural drilling."

However, instead of a wash pipe with or without a chisel or fish-tail bit, structure drilling employs a heavy flush-joint hollow drill rod at the end of which is a hollow chopping bit set with tungsten carbide teeth similar to those used on pneumatic drill bits. This drill rod is chopped up and down in the usual manner through casing. But, instead of water being forced down the wash pipe, it is forced by means of a packing gland casing head to travel between the rod and the casing down to the chopping bit to carry the cuttings up inside the drill rod.

One big advantage is the greater clearance inside the drill rod which enables large fragments of formations, even short sections of core, to be washed to the surface, hence reducing the drilling time.

Other advantages are that, being used with a standard diamond drilling rig, the bit can be rotated through softer formations, chopped through broken hard rock that ruins diamond bits, and, in very hard, solid formation, the usual diamond drilling procedure may be employed. Here then, is one of the best all-around drilling methods for shallow drill holes, although it is limited to angles less than 45 degrees from the vertical.

In discussing diamond drilling, much could be gained by the engineer engaged in construction, foundations, or mineral exploration where the diamond drill is employed, if he more fully understands the limitations of the diamond drill, the type of diamond most suitable, and the type of bit most applicable.

Experienced Diamond Drillers Recommend:

—"Structural drilling" for alluvium or unconsolidated overburden.
—West African bort for coarse grained, medium hard, tough rock.
—Congo bort for fine grained, very hard, tough rock.
—Diamond chips cast in powdered metal for fractured ground.
—Brazilian carbonados in a hand-set bit for extremely hard, fractured, siliceous rock.
—Stones of two to 12 per carat for soft rocks, 12 to 24 per carat for medium hard rocks, up to 90 per carat for dense, very fine grained hard rocks.
—Double core barrels for higher core recovery.
—Detailed records for cost accounting.

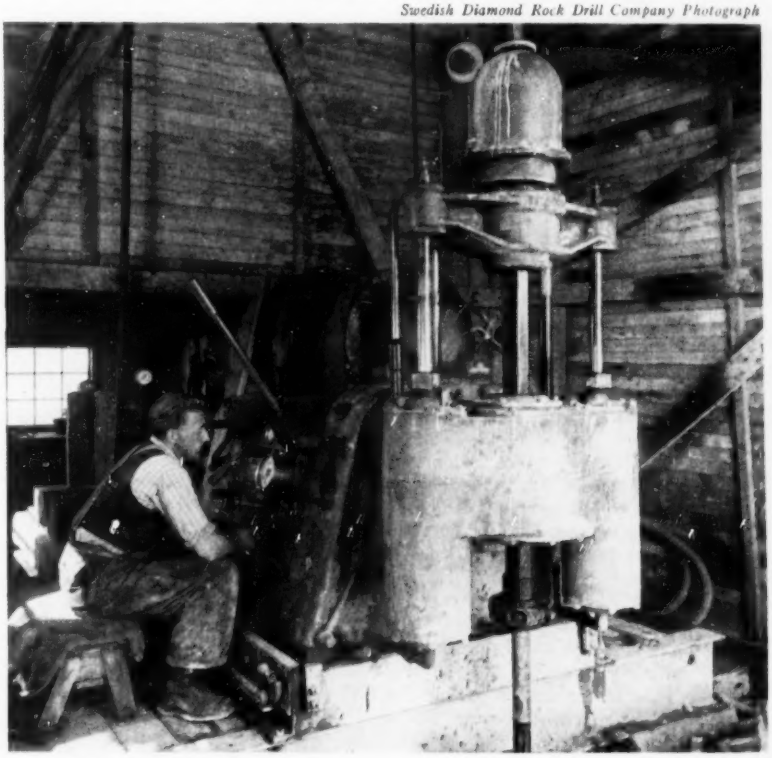
Diamond Data

The diamond itself is more or less taken for granted. Prior to 1930, diamond bits were hand set by peening large Brazilian carbonados into holes drilled in the bit crown; but due to the rise in their cost, machanical setting of the far cheaper or more plentiful African stones was developed.

1. The Brazilian carbonado, which is a compact, opaque, black to grey stone without cleavage, and ranges from 2.75 to 3.50 in specific gravity. The lower gravity stones are very porous, and hence, softer. The higher gravity stones are more dense but somewhat brittle and therefore cannot withstand as much shock. Shrewd buyers try to select those stones ranging between 3.30 and 3.35 in specific gravity. Cost per carat ranges from $35.00 to $120.00 depending upon color, specific grav-

A heavy-duty Swedish hydraulic-feed diamond drill.

Swedish Diamond Rock Drill Company Photograph



A platform mounted diamond drill and churn drill combination used on the Mesabi Range.

ity, mine-run or (broken) into suitable sizes. The stones are broken into somewhat cubic pieces of 2.0 or 4.0 carats (wasting up to 25% in the process), then set into drilling bits. Used, rounded stones have toughened and are at a premium.

2. West African stones or bort are the imperfect diamonds, resulting from the gem mining industry, and account for some 95 percent of the production by weight. These crystallize in the cubic system, and are generally colored yellow, red, green, blue, brown and black. These are the hardest diamonds of all, but are brittle due to the perfect cleavage. They range in size from 100 or more per carat to several carats in size. The better quality is used for other industrial purposes. Three general qualities of drilling bort are A, AA, and AAA, ranging in price from $4.00 to $12.00 per carat.
3. The Congo diamond is similar to the West African, but is generally rounded by an opaque coating that precludes classification. These stones run in the same size range, but are tougher than the West African. The cost is between $4.00 and $7.00 per carat. Prior to 1940 this diamond was considered inferior, but due to the demand for diamonds (the United States used almost 1,000,000 carats of industrial diamonds a month during War II), Congos were resorted to and were found to be satisfactory. Since 1945, the drilling industry, largely through U. S. Bureau of Mines experiments, has obtained better results from them than the A or AA West African bort. This probably has been known before because most of the Congos smaller than 10 per carat are difficult to obtain. One California company, however, has set Congos for many years with excellent results.

The diamond output is controlled quite rigidly, although considerable smuggling has been going on in recent years. Prior to 1930 "crushing" bort was obtainable for about $1.00 per carat, and hardly doubled in price up until 1940.

Cast-Set Bit Development

Diamond drilling was seriously curtailed by 1930 as a result of the high price of Brazilian carbonados, then sold for more than $175.00 per carat. This was fortunate, however, because it stimulated experiments with cheap West African diamonds. Hand-setting them like carbonados was an extremely delicate operation because they couldn't withstand the shock of overpeening but such bits were used successfully at Hoover Dam, resulting in a great reduction in drilling costs. Mechanically set bits gave better results and soon cast-set bits were in production. Experiments were also being conducted to set diamonds in powdered metal. The big drawback, however, was the lack of control over shrinkage that resulted in defects in the crown. This was overcome, at first, by pressing strips which were then brazed into radial slots in the core bit crown. As powder metallurgy progressed, shrinkage was overcome, so that by 1940, all types of drilling bit crowns were being manufactured directly onto bit blanks. The toughness of the cast copper-beryllium alloy matrix was increased by adding nickel and chromium, thereby increasing the abrasion resistance and increasing the bit life in very abrasive ground. The powder-metal bits went further by developing matrices consisting essentially of powdered tungsten carbide bonded with copper or, better, nickel-silver for the highest abrasion resistance. The primary concern was to create a firm bond to the diamond in a prepatterned position.

The choice of matrix is generally governed by the type of ground to be drilled. If it is only mildly abrasive, a cast bit is preferred; if very abrasive, a nickel-silver bonded tungsten carbide bit is in order. The resistance of the matrix, however, should not exceed the cutting life of the diamond, otherwise a higher setting cost would be wasted.

The diamonds that are used in bits should be carefully selected in

Accepted Standards For "X" Series Diamond Drilling Equipment Measured in Inches

Equipment	*Tolerance**	*EX Size*		*AX Size*		*BX Size*		*NX Size*	
		*OD***	*ID****	*OD*	*ID*	*OD*	*ID*	*OD*	*ID*
FOR CORE BARREL									
Bit blank	0.002	1.430	0.875	1.835	1.218	2.300	1.687	2.915	2.187
Set bit	0.005	1.460	0.845	1.865	1.185	2.330	1.655	2.945	2.155
Reaming shell blank	0.002	1.430		1.835		2.300		2.915	
Set reaming shell	0.005	1.485		1.890		2.360		2.980	
FOR CASING									
Bit blank	0.002	1.830	1.437	2.295	1.812	2.910	2.250	3.560	2.875
Set bit	0.005	1.865	1.405	2.330	1.780	2.945	2.215	3.595	2.840
Reaming shell blank	0.002	1.830		2.295		2.910		3.560	
Set reaming shell	0.005	1.890		2.360		2.980		3.630	
Shoe bit blank	0.002	1.830	1.505	2.295	1.910	2.910	2.380	3.560	3.000
Set shoe bit	0.005	1.865	1.500	2.330	1.905	2.945	2.375	3.595	2.995
FLUSH JOINTS AND COUPLINGS									
Flush joint casing	0.002	1.812		2.250		2.875		3.500	
Flush coupled casing	0.002	1.812	1.625	2.250	2.000	2.875	2.469	3.500	3.063
Casing coupling	0.002	1.812	1.500	2.250	1.906	2.875	2.375	3.500	3.000
Flush joint drill rod		(Canadian XRT size; not mfg. in U.S.A.)							
Flush coupled drill rod	0.005	$1\frac{11}{16}$	$\frac{15}{16}$	$1\frac{5}{8}$	$1\frac{1}{16}$	$1\frac{29}{32}$	$1\frac{1}{32}$	$2\frac{3}{8}$	2
Drill rod coupling		$1\frac{11}{16}$	$\frac{7}{16}$	$1\frac{5}{8}$	$\frac{7}{16}$	$1\frac{29}{32}$	$\frac{5}{8}$	$2\frac{3}{8}$	1

* Tolerances are plus or minus. ** Outside diameter. *** Inside diameter.

size and grade although much hocus-pocus still surrounds some quarters of the manufacturing industry, with the user generally getting little factual information about the actual quality he gets to use. It is the author's opinion that good, used diamonds are preferable to new, untried stones because the inferior stones are destroyed in a new bit, while the used stones returned for resetting have been subjected to and have withstood punishment and therefore are the better for it.

Diamond Salvage Facts

Many large users of diamond bits practice removal of the diamonds from used bits in their own laboratories. This is a good practice because it prevents getting inferior grades into the bits. It also eliminates the opportunity for the manufacturer to "scrap" a certain percentage of resettable diamonds in order to sell more new diamonds to bring the reset bit up to proper carat weight. The profit by the manufacturer is in the diamonds he sells more so than in the setting of them into bits; therefore, certain practices could be guarded against. Certain bit manufacturers sell only new diamonds in their bits and add only new diamonds to the resettable bits as are needed. But, at the end of the exploration program, when the salvagable bits are to be reclaimed, the still usable diamonds will be bought back at scrap price, usually, at $1.00 to $1.50 per carat. Other concerns have a more equitable policy of buying back all usable diamonds at the original selling price and either giving credit for the scrap and charging for the reclaim, or keeping the scrap for the cost of reclaiming the bit.

All bits should have the exact carat weight stamped on the bit shank as well as the bit number; this information is recorded before the bits are used. Later the reclaim data will give accurate bit costs. Where doubt exists, a random bit from the factory should be reclaimed before use to determine whether the quantity and quality of diamonds check with that stated on the invoice.

Pick Stones And Bits For Rock

For most types of drilling ground, the AA West African or round Congo diamonds will give satisfactory results; the use of A quality West African stones generally results in higher diamond loss, and therefore, higher bit costs. The use of AAA (round and semi-round) West African bort should be limited to very tough drilling conditions.

W. A. Richelsen Photograph

A NX diamond core drill on a Wyoming sulphur exploration project. The air powered drill is mounted on a column screwed into a nipple and cemented into the solid rock. Note the stay bolt and turnbuckle used to take up slack.

Where West African stones take on a rapid polish the Congo set bit should be substituted because the Congo will not take on a non-cutting polish as quickly as the West African diamond will in very fine-grained, hard rock. Where very broken, hard rock is being drilled, a powder metal bit impregnated with coarse diamond chips often gives very economical results, especially if the matrix is chosen to abrade only slightly faster than the wear rate of the diamond particles. In non-abrasive ground these bits tend to polish and burn, however, requiring repeated sand-blasting to expose the cutting diamonds. This type of bit is used until the crown has been consumed. Where extremely hard, broken, siliceous rock is being drilled, such as those pre-Cambrian formations encountered in the Lake Superior iron districts, the old hand-set Brazilian carbonado bit still gives better results and lower costs than the best of mechanical set bort bits.

In general, the weight of diamonds used in a bit should run about 8.00 carats West African or 10.00 carats Congo per square inch of projected bit crown and the size of stones generally should be two to four per carat for the softest rock and up to 12 or 14 per carat for soft but firm rock. These would include chalk, siltstones, softer shales and shaley sandstones. Usually, granular rock or those that make coarse sludge require the large diamonds for more efficient drilling. These sizes can be either West African or Congo. For harder rocks, the smaller diamonds are employed for better results. Twelve to 24 per carat should be used for medium hard rocks such as fine-grained sandstones, limestones, dolomites and greenstones. Up to 90 per carat for dense, very fine-grained hard rocks such as granites, quartzites, silicified dolomites, cherts, and jaspers may be used. If the West African diamond tends to polish, use either the Congo diamond or the impregnated bit.

For various broken rocks, especially the harder, silicified types, the manufacturers recommend many small high-quality diamonds or impregnated bits. Broken rock can never be satisfactorily drilled without very high bit costs and if hand-set carbonados are not available, then the broken section should be chopped through with a chisel bit or a hollow structural bit wherever possible. Many coring projects have attempted to core broken rock without much successs; chopping would have been more economical and would have resulted in just as much information.

Recently, as the result of U.S. Bureau of Mines experiments, great strides have been made in setting diamonds to present their maximum-wear hardness vector, resulting in greater footages and longer bit life than possible by non-orientation as practiced by commercial bit manufacturers.

Diamond Sizes

The number of diamonds per carat recommended above are only approximate in that manufacturers' bits are made in certain ranges. The higher quality diamonds are more dense; hence, there are fewer stones per carat. Listed below are the aver-

This is a Wheel Trueing Tool Company Truco "EX" pilot bit after drilling 26,722 feet for the Warner Company at Bellefonte, Pennsylvania. The original 14.16 carats of diamonds had worn to a weight of 9.65 carats.

age number of stones per carat for various sizes:

Screen No.	*Stones per Carat*
1	55-65
2	45-55
3	35-45
4	27-32
5	20-24
6	15-18
7	12-14
8	9-11
9	8-9
10	6-7
12	4
14	3
18	2
22	1

In order to select the diamond size most suitable for the formations to be drilled, an understanding of the character of the rock is most helpful. Little has been published on the action of diamonds; the author contributed some study and thought on this subject in "Mud Flow Through Oil Field Diamond Core Bits"[1]; and also in a discussion on "Diamond Drilling Quartz-Feldspar Intergrowths."[2] The former mentions diamonds acting like a multiple drag bit and wear by frictional skin heat, causing spalling and surface oxidation of the diamond; the latter covers diamond contact area and "point force," penetration and possible means of avoiding non-cutting polish.

With the ever-increasing need for core drilling both in mining and construction work, the stress is on better core recovery. Here there are widely divergent opinions on the type of core barrels that will give the desired results. Recently the development of a double tube core barrel wherein the inner tube contains a tapered case within which the core lifter rides, has been a marked improvement over the standard barrel with its bevel-wall core bit, where small fragments of core wedging between the taper and the core is responsible for much of the core blocking, core scouring and breakage, as well as for much of the rod snapping heard on the surface.

Barrels For High Core Recovery

This new barrel is called the M-Series and has become increasingly popular due to its high core recovery. A few years ago, the author was responsible for the revised specifications of the M-Series core lifters, and also for a new type of lifter with external ribs and carbide chips fused to the inside in strips, which was used by the U. S. Bureau of Mines with excellent results. The basis for its design was to create high friction against the core without resorting to high compression and also to create a minimum external friction for immediate positive seating to prevent core slippage.

The one drawback of the M-Series core barrels is the weakness of the necessarily thin outer barrel wall and the frail threads. To lessen this, the heavier L-Series barrel was developed, wherein the core lifter case, instead of being threaded, is held onto the inner tube only by slip fit. On recovering core, the stress is not on the inner tube but is transmitted onto the outer tube. This L-Series barrel also has a much shorter bit eliminating the higher setting cost of the tube-like M-Series bit. The L-Series barrel also has other advantages. The lifter case can be replaced by a straight-wall inner tube extension so that coring may be done in the same manner as one would with a double tube barrel and a straight wall bit. This method is preferred in many sections, particularly in Canada. A bevel-wall bit and lifter can also be used by substituting a reaming shell in place of the L-Series bit.

AAA West African drilling diamonds.

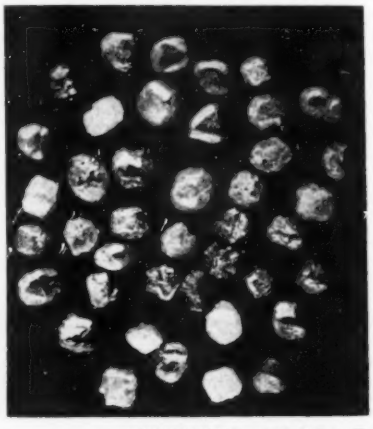
Regarding core barrels in general, the larger the size the better core recovery is usually. In jointed rocks, however, using a barrel size that will accommodate the longest core proportionate to the joint spacing can result in better recovery and longer core runs. In badly broken rock, a straight wall bit on a swivel-type double tube barrel will recover more core than a bevel bit because the lifter and the wedging of rock fragments in the bit taper tend to destroy core and cause core blocks. Dry blocking with a straight wall bit to recover core, unless done very carefully, will result in higher diamond loss as a result of burning, especially in fine-grained hard rock. The M-Series and the L-Series barrels seem to have struck a medium between bevel and straight wall bit coring and their use should be investigated when other types have given too erratic runs and poor core recovery.

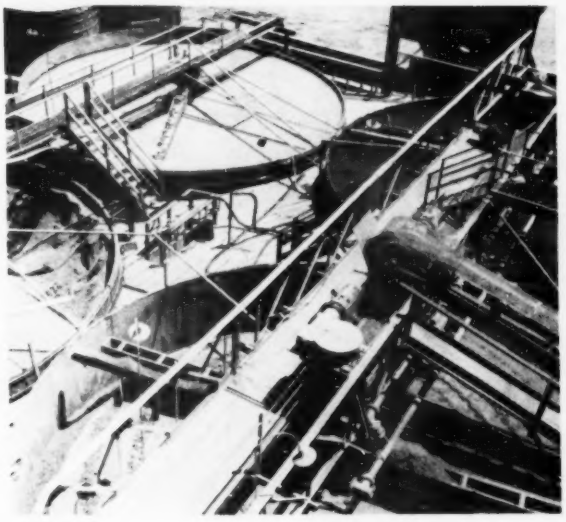
Records For Cost Cutting

With so much coring being done on company account, the engineer in charge should do everything possible to increase core recovery and reduce diamond consumption. This can be done by keeping detailed records of bits used and the results obtained, then studying these results. One big drawback, however, is the lack of complete drilling records on the part of the drill runners. There is a great need for an automatic drilling time recorder such as is in use on oil field drilling rigs. This instrument could be adapted to record penetration time by fractions of a foot instead of by the foot as used in oil field practice; it would also keep accurate record of actual drilling time, down time, and time spent pulling rods. With this information the engineer could keep an accurate tab on the performance and efficiency of both crew and equipment.

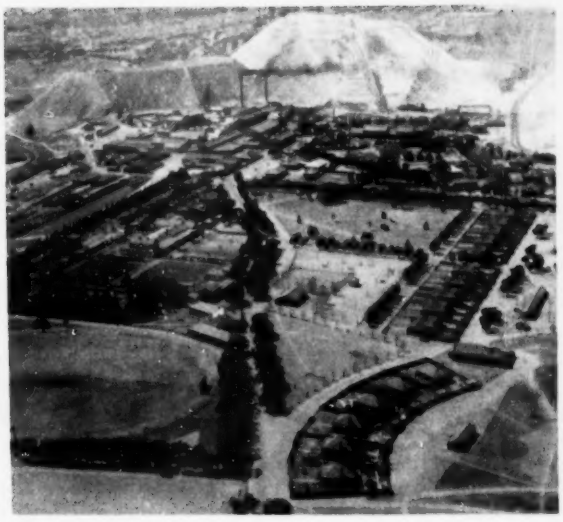
1. *Journal of Petroleum Technology*, Section 1, July 1950, pp. 8-9.
2. L. C. Armstrong, *Mining Engineering*, June 1949. *Transactions AIME*, vol. 187, p. 1148.

Diamonds from the Belgian Congo.





COLORADO



SOUTH AFRICA

New Mills and World-Wide Ore Discoveries Insure Uranium Adequacy For Hydrogen Bomb

COLORADO—The United States Vanadium Company, the largest producer of uranium in the United States, has just put its new two-roaster, high-lime uranium plant into operation at its Uravan, Colorado, plant. The new plant will treat carnotite-type, uranium-vanadium ores from the Colorado Plateau. Heretofore, only a limited amount of high lime ore was mined and milled because of the metallurgical difficulties in recovering uranium.

SOUTH AFRICA—First commercial production of by-product uranium from the gold mines of the Witwatersrand has been made at the new slime treatment plant of the West Rand Consolidated Mines, Ltd. at Krugersdorp, Transvaal, Union of South Africa. The $4,500,000 by-product plant, construction of which was started in early 1951, was placed in operation on schedule early in October. The new plant treats slime from the mines' West Reduction gold mill which has been treating 40,000 tons per month of gold ore from the Bird Reef conglomerate beds. The Bird Reef has been correlated with the Vaal Reef at the Stilfontein Gold Mining Company, Ltd's. properties and with the Basal Reef of the Orange Free State gold mines. West Rand is the first of 13 South African gold mines that are building by-product plants to recover uranium.

NORTHERN AUSTRALIA—The Zinc Corporation, Limited, one of Australia's largest mining firms, has been engaged by the Australian government for the rapid development of the Rum Jungle uranium deposits 50 miles south of Darwin. A typical uranium prospectors camp is shown near Rum Jungle.

TASMANIA—Tasmanian Premier Cosgrove reports an aerial survey indicates uranium in southwestern Tasmania, south of Queenstown, in the district pictured on this page. Mount Lyell Mining and Railway Company, Ltd. is beginning large-scale geological prospecting here. The terrain is rugged and only partially explored. Vegetation is often so thick and matted that prospectors walk on top of the wind-blown trees and have to cut their way to the ground to check the geologic formations.

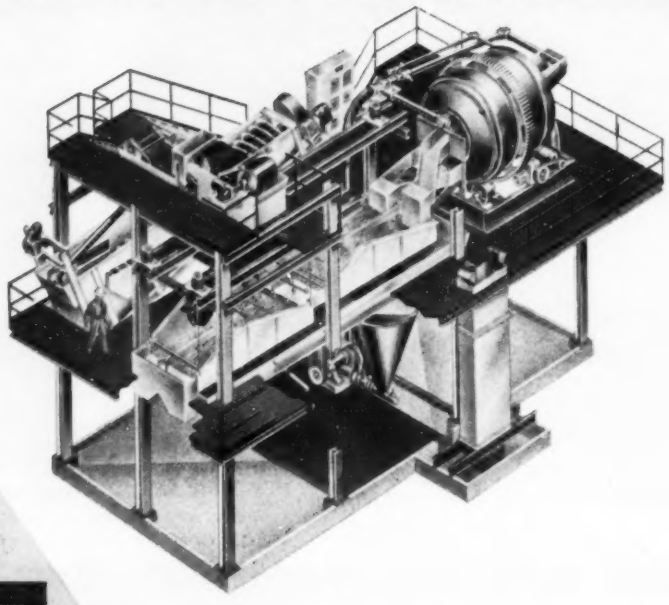
NORTHERN AUSTRALIA

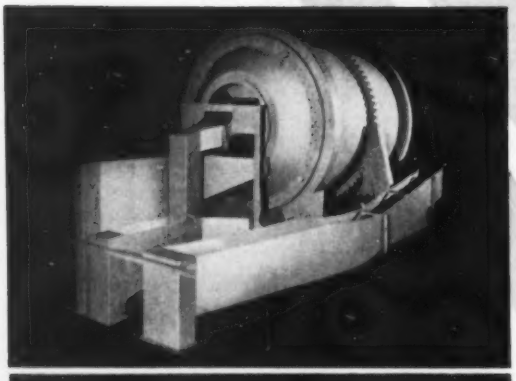
TASMANIA

PRECISION CONTROL MEANS BETTER METALLURGY!

The WEMCO MOBIL-MILL gives you precise control of separating conditions with ores amenable to HMS.

WEMCO design allows accurate control of media density and positive sink removal — assures higher grade concentrate and lower tailings.





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WEMCO MOBIL-MILLS give you **three** types of separators to choose from — fits the equipment to your problem for optimum operating efficiency:

1. **WEMCO** Double Drum Separator gives two stage separation in a single unit for treating ores having a middling component.
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WEMCO MOBIL-MILLS are **prefabricated,** complete processing units manufactured to precise standards according to field-proven design. Mobil-Mills are quickly and easily installed by **your** mechanics or a **WEMCO** crew, are simple to operate and require a minimum of attendance.

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- *Low initial cost*
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U. S.---A "NEED MORE" NATION

Conventioning miners hear attacks and defense of the Paley Report, and state of strategic minerals industry at Western Division meeting of AMC

"The United States is not a have-not nation but a need-more nation," said Howard I. Young, president of the American Zinc, Lead and Smelting Company and deputy administrator of the Defense Materials Procurement Agency in opening the Metal Mining Show in Denver, Colorado in late September.

He was referring to the recently published 1,000,000-word report of the Presidents Materials Policy Commission, popularly known as the Paley Commission (See *Mining World* August and September, 1952). He urged that the mining industry review its thinking on natural resource problems in view of the changing age in which we live. The report has a forward-looking theme and is the one government report for real discussion and serious thinking within the mining industry, he added.

The Commission and its report were ably represented by Arthur H. Bunker, New York, commission member and president of the Climax Molybdenum Company. It was readily apparent that many did not agree with the stand he took on the report, but all agreed that he did a remarkable job in presenting the Commision's views and sincerely defended its position against all opponents and questioners.

He said, "The overall objective was to insure an adequate dependable flow of raw materials to the United States' industries." He felt that the mining industry had contributed much to the writing of the report and many of its views were incorporated within it.

Industry Advice

The Commission had secured help in compiling the report from industry meetings and advisory groups. A 40-page detailed questionnaire had been sent to 275 domestic metal producers and 60 percent had been completed and returned. The Commission had used the services of various consultants, and a review procedure had been used to obtain opinions of 70 or 80 industry leaders about the report before its final publication.

Andrew W. Fletcher, New York, president of the St. Joseph Lead Company, said that this system of industry advice had no bearing on the final report and that St. Joe had told the Commission for months that it was in error in regard to lead, and still was.

Bunker outlined the growing importance of government in the mining industry and that the report was another example. Government now sets the taxes, monetary and labor policy, establishes prices. It is a regulator of private industry by power and gas allocations; it establishes a foreign policy affecting mining. It is the custodian of resources (mineral lands); it is a supplier of services (U. S. Geological Survey and U. S. Bureau of Mines); it is the largest buyer and user of many mineral products (military, stockpile etc.), and sets the research pattern in many cases.

He concluded by saying that the task of the Commission can never be completed. The report was only the beginning and in the future the industry must carry on the job with the government.

Error In Lead Estimates

Andrew Fletcher opened the industry discussion of the report and confined his remarks to lead—the metal with which St. Joe is most familiar. The Commission foresaw a lead deficit of 900,000 short tons in 1975. St. Joe "guessed" it would be only 200,000. He said he saw "no reason why lead consumers, or any one, should be alarmed about the future lead supply. A comparison of the differences for lead raises great doubts as to the validity of the Commission's findings on other metals."

Why Buffer Stocks Won't Work

Simon D. Strauss, vice president, American Smelting and Refining Company, New York, showed why recommendations of the Commission regarding creation of international buffer stocks would not work. Currency difficulties would be insurmountable. What money would they use? Many nations' money resources are already overtaxed. More than 50 nations would agree? Never. A similar international group, the International Tin Committee had accomplished nothing. Tin producers and consumers are fighting. The International Monetary Fund with 54 governments as members had failed at monetary stabilization, so how can an international group stabilize private production of metals? Government control is slow and cumbersome, price judgment had been poor, as shown by English government's recent high price buying of lead and zinc. Such a buffer stock would be subject to political pressures and nationalization. Substitution of politicians for industrialists does not make the cartel recommendations palatable.

Senator Henry C. Dworshak, United States Senator from Idaho, reported on the political aspects of the report. He foresaw arrogant assumptions of congressional power by

GOLD WINNER OFF ONLY 0.083 POUND

C R. Cameron, general superintendent, Lone Star Steel Company, McAlester, Oklahoma (center) holds the $100.00 worth of placer gold he has just won at the *Mining World* booth. His winning estimate of the weight of the gold ore shown on the scale was 188.333 pounds. The actual weight was 188.250 pounds. E. E. Hopper, Evergreen, Colorado was second with an estimate of 188.014 pounds. Five other contestants guessed within one pound of the true weight.

LEFT: The Bucyrus-Erie exhibition featured a scale-size operating model of the giant 1150-B dragline. RIGHT: Operating equipment was displayed outside the convention hall. Pictured here is a Caterpillar tractor equipped with a Traxcavator loader and a Ruth Diesel exhaust gas air conditioner. This complete unit is specially assembled for underground loading.

the executive branch of the federal government in putting into effect certain recommendations of the report.

He warned of the danger of removal of import duties on metals and said such power would jeopardize the mining industry if such power were given to an administrative agency.

Flexible Tariff Needed

Edward H. Snyder, president of the Combined Metals Reduction Company, Salt Lake City, Utah, said that from his experience he would guess "that the over-all ore reserves given in the report are probably less than 10 percent of those that can ultimately be mined." He agreed with the Commission "that the nation can ill afford the waste which is incident to violent fluctuations in metal prices, such as we have witnessed during the past four years," and also agreed that "buffer stocks might be a satisfactory solution to this problem. However, these stocks should be national and not international and operated by regulations spelled out in detail by our congress, and not left to the planners in the State Department or any other government agency.

"On the assumption the world is not going to run out of metal, a flexible tariff to automatically maintain, within reasonable limits, the price level the domestic mining industry must have to perpetuate itself would be far more satisfactory to the taxpayer.

"The Commission's recommendations as to loans, coupled with selective price contracts, provide an unfair type of competition for those who maintain production without government help, and the domestic industry may soon be seriously hurt by surpluses created by such devices."

Defense Minerals Progress

Howard I. Young, deputy administrator of the DMPA, outlined the accomplishments of the agency during its little more than one-year life. Expansion goals have been set, with 1955 the target year. Many different steps have been taken to aid the mining industry in reaching these goals, including purchase and resale contracts, tax amoritization certificates, opening of new mines, keeping high-cost mines in operation, payment of over-ceiling prices, and development of new metallurgical processes. Increased production goals for 1955 over 1951 output are as follows: beryllium, 70 percent; copper, 25 percent; fluorspar, 50 percent; iron ore, 40 percent; manganese, 30 percent; mica, 50; molybdenum, 130; nickel, 35; tungsten, 190, and zinc, 15 percent.

Jess Larson, DMPA administrator, said that he hopes the agency can be disbanded by the end of 1953, and that he is making plans accordingly. It is an emergency organization created by war-time requirements of insuring adequate minerals for military needs and maintaining a high level of civilian production.

Small Mines Session

Howard W. Balsley, Moab, Utah, reported on the status of the independent uranium-vanadium miner on the Colorado Plateau. As a result of charges made by the small miners, a marked improvement in sampling practices is now in evidence, he reported. Assaying, however, is another matter, he said. Allocation of U.S. Atomic Energy Commission leases was a difficult job and open to charges of favoritism. He thought that the present uranium bonus for new production was both unfair and unequitable and was actually reducing uranium output, instead of stimulating it as was planned. He said further that the bonus is unfair for those early producers who did much of the pioneering and produced ore when the price was lower and the demand as great. Today there are a number of mines with substantial past production which are idle or operating at a loss. They have produced the maximum amount of ore for the bonus and were therefore shut down because operating costs precluded production of much known low-grade ore without the bonus. He recommended that the bonus be eliminated and that all production be paid for at a consistent uniform price of $7.50 per pound.

Robert S. Palmer, executive director of the Colorado Mining Association, outlined the need for a strong domestic mining industry in this period when the administration supports foreign mining. He said that "finding new mines in the United States is a good insurance policy regardless of cost," and that "contractual concessions should be extended to small miners and that long term contracts with escalator price clauses should be awarded, because in the small miner is involved the future of America."

Attack From Within

United States Senator Pat McCarran from Nevada warned that a Communist-inspired attack from within could dominate the nation. "The people must realize that the enemy exists and is active within the country under many disguises, using both aliens and citizens. He has already been fantastically successful in achieving some objectives."

"The Communist party may have gone underground, as such, but the Communist conspiracy in the United States is still extremely active. There are in this country today American citizens of good education

LEFT: Visitors thronged into the main display hall to see equipment from all over the United States. Prominent names of equipment manufacturers in the mining world can be seen in this picture. RIGHT: Christensen Diamond Products Company displayed a wide variety of diamond bits and the various types of stones used for setting bits.

and great ability who are doing the bidding of the Communists," the Senator said.

Exploration or Development?

L. J. Randall, president of Hecla Mining Company, Wallace, Idaho, urged that the best method to encourage mine development was to make the cost of exploration fully deductable from income tax returns. He added, "under present laws there is often a great deal of uncertainty as to how we should distinguish between expenditures for development and expenditures for exploration." "For example," he said, "suppose a corporation undertakes an exploration and development program calling for an expenditure of approximately $800,000 over the next two-year period to be financed from profits realized from a presently producing property. The question arises as to whether this expenditure is fully deductible as development cost under existing law or only to the extent of $75,000 per year as exploration cost."

Gold Guarantees Lasting Value

"Hard Money Versus Inflation" was the subject of a talk by South Dakota's United States Senator Francis Case at the Monetary Policy discussion. The time has come, he stated, "when the economist, the engineer, the financier and the miner must join hands in saying to the next administration, whatever it may be and whoever it may include, that the welfare of the country demands recognition by the United States of the full part that gold can play in combating inflation and in restoring economic health to the nation."

"Today there is the need for an effective curb on the fires of inflation. Every producer in whatever field, every buyer of goods in whatever field, every worker in whatever field, will benefit if government and citizen can have the self assurance which goes with the substantial guarantee of lasting values given in terms of gold."

Strategic Minerals

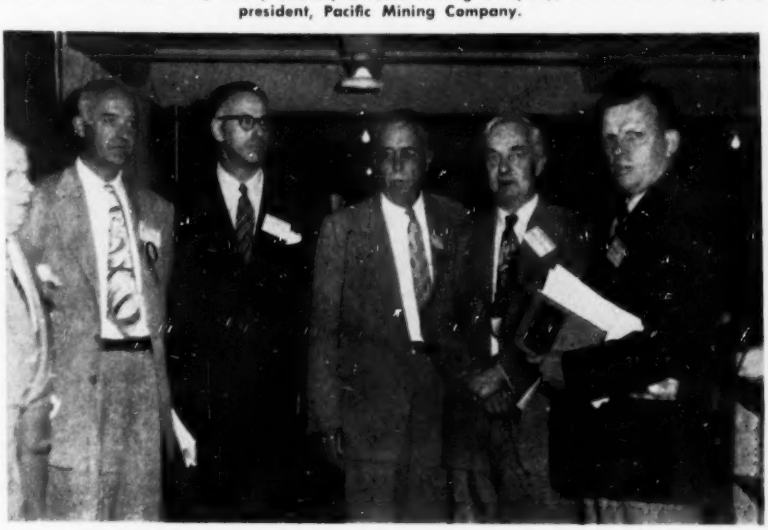
The strategic minerals session brought forth the views, questions and comments of the strategic mineral producers, but unfortunately many of the questions remained unanswered because there were no government planners and policymakers present to outline the administration's domestic strategic minerals policy.

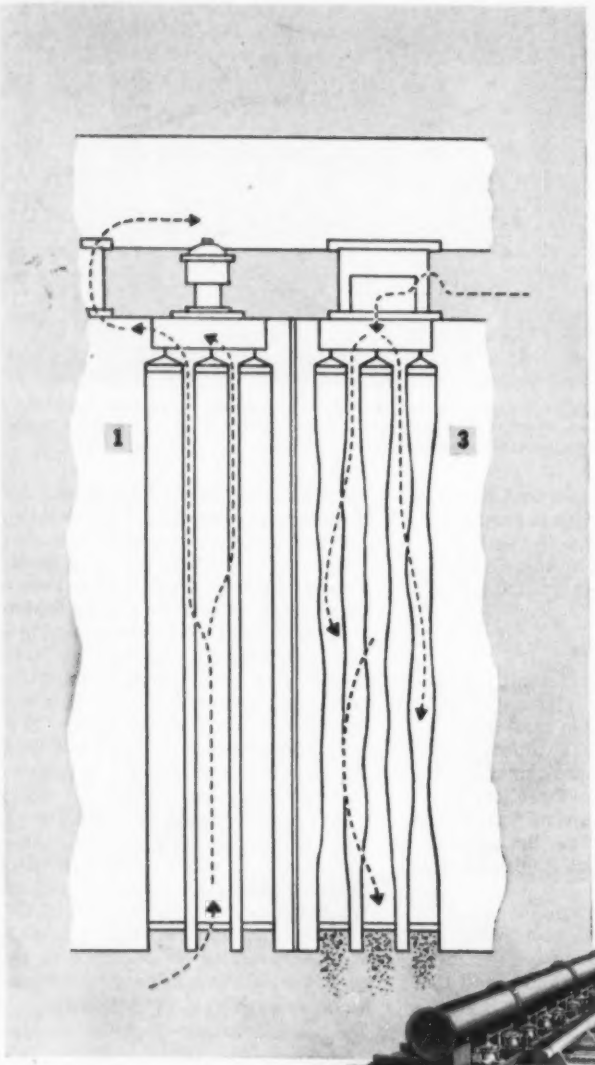
P. R. Bradley, Jr., president of the Pacific Mining Company, San Francisco, said the government's manganese program was a failure and that "today we produce a smaller proportion of our needs than before the program was launched following the start of the Korean war."

James P. Bradley, vice president, Bradley Mining Company, San Francisco, reported that the United States is almost completely dependent on antimony imports and that the "national stockpile is dangerously inadequate, with only a six month's emergency supply." However, the Munitions Board has announced that the stockpile objective for antimony has been completely filled.

W. L. Long, president of the Tungsten Mining Corporation, Warrenton, North Carolina, called on the tungsten producers to establish in Washington, D.C. a Tungsten Institute for education of the government of the necessity of maintaining a good workable tungsten program as a phase of national preparedness.

Highlight of the convention was the session on "Strategic Minerals" where the speakers were, from left to right: F. W. Libbey, director, Oregon State Department of Geology and Mineral Resources; Gordon I. Gould, president, New Idria Mining and Chemical Company; James P. Bradley, vice president, Bradley Mining Company; L. Long, president, Tungsten Mining Corporation; Sam H. Williston, vice president, Cordero Mining Company; and P. R. Bradley, Jr., president, Pacific Mining Company.

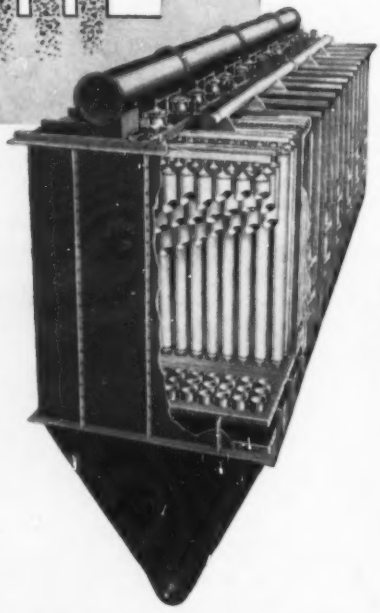




How Norblo gives you 24-hour-a-day dust collection at full rated capacity

Fast double-action bag cleaning assures full efficiency and constant suction drop across the arrester

No matter what the task in large scale continuous operation, Norblo equipment stands the gaff — with low maintenance and economical over-all cost. Norblo Automatic Bag Type Dust Collectors have been completely reliable in all types of installations for over 25 years, proving the soundness of the operating principles described below:



1 Basic unit compartment houses 78 cylindrical bags — fully distended by upward inside air flow.

2 Variable timing of cleaning cycle, easily adjusted according to dust load, insures constant volume of air handled and constant static pressure drop across the arrester.

3 Bag cleaning involves only one compartment at a time, and only a few seconds out of each hour of operation. During cleaning period bags are shaken and air flow is reversed, loosening dust and accelerating its descent into the hopper. *This double-action bag cleaning insures utmost efficiency of the equipment and in no way interrupts the suction drop.*

4 Any compartment may be cut out of operation for bag replacement or repair, all other compartments remaining in operation.

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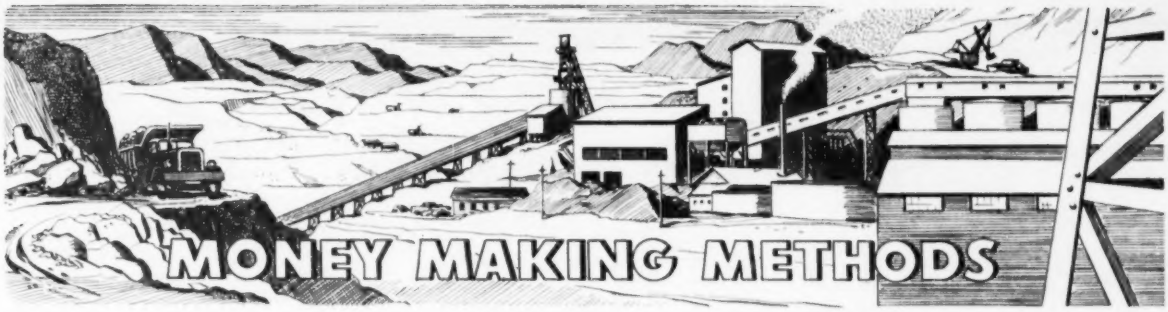


CARE and WEATHER PROTECTION GIVE WIRE ROPE LONGER LIFE

The better care and protection you give wire rope, the better it will serve you. That means you reduce your costs of operation—and who can turn that down these days?

Quality always pays off in a product like wire rope. A high-quality rope naturally possesses high abrasion-resistance, because it is made of finer steel. It also has higher resistance to breaking, either by direct pull or by frequent flexing. That point is demonstrated at the A. Leschen & Sons Rope Co.'s plant, where every coil of wire used in rope manufacture undergoes rigid testing for both tension and torsion. There is a difference in "raw" wire, and when wire is discovered which doesn't meet top-standard requirements it is always rejected. If imperfect wires are stranded into the rope, the rope quality suffers and it wears faster.

Normal abrasion can also be reduced by frequent lubrication—using a thin coat of adhesive lubricant. A study of the operation and the layout may also suggest ways to reduce abrasion. Sometimes it is advisable to increase the load, within safe limits, and to reduce speed as a means of lessening abrasive action. If an operator gets into the habit of starting equipment too fast, he might better slow down, in order to reduce "dragging" in the sheaves or blocks. You'll gain in rope service.

Blocks and sheaves should always rotate freely. Keep bushings well lubricated, so that lines won't be dragged over sluggish equipment. Soft sheaves or sheaves that are too small will show rope treads, which indicate they are unnecessarily hard on rope. These treads mesh almost perfectly with the strands of the rope that make them, but when a new rope is installed it will be entirely out of mesh and the ridges of the treads will become cutting edges with great ability to do damage. This damage will show up first in scratches or cuts. Scratching or scrubbing may also result from poor spooling on drums, which will happen if the rope rolls away from or over the next wrap on the drum. Tight, even spooling, especially on the first layer, reduces wear.

On any line that runs from a drum through a series of sheaves, the portions of the rope that rest on the sheaves and on certain critical points on the drum absorb far greater stresses than the rest of the rope at the moment when the load is fully applied. If the rope returns to its original position for each lift, these parts are bound to wear faster. The solution is to cut off at regular intervals a length of rope sufficient to move these parts from the critical points. Better utilization of the length of the line will result.

A common cause of abnormal abrasion is careless handling. Prying the rope, either to move the reel or to move wraps closer together on a drum, should be avoided. Also avoid sudden severe stresses. Many lines on service jobs are abraded by being dragged across rocks or other objects. Sometimes lines are unnecessarily allowed to touch the ground between the storage reel and the sheave. Especially under warm weather conditions when the lubricant may be tacky, the rope picks up sand which acts as a file on the sheaves. This should be avoided whenever possible, and even if it is necessary to change the layout, savings will justify the change.

A common condition on operations where wire rope must be kept handy for replacement purposes, is to have reels of rope outdoors—exposed to rain, dust, and other elements. When this is necessary a few simple precautions will pay extra dividends. Do not allow the reel to stand directly on the ground or even on a cinder-covered area. Mount it on a reel stand or on heavy timbers, otherwise, the weight of the rope may cause the reel flanges to become embedded and the rope to rest on the surface. This practically guarantees rapid corrosion. A temporary make-shift covering of corrugated iron or any similar material that happens to be handy is helpful. So is good lubrication. But there is only one way to be sure that complete protection is provided. That way is to order your rope with a special protective lepro coating that seals the rope completely from air and moisture. When you get a good, factory-applied coating that forms a hardened, protective surface, your problems on this score are answered.

Two good ways to protect your wire rope are illustrated here. First, mount the reel on timber blocks or a reel stand. Second, order your rope covered with a special protective coating to seal out dirt, air, and moisture.

Muriel Sibell Wolle Describes

BEARTOWN AND STONY PASS

The mountains at timberline at the head of Bear Creek, near the source of the Rio Grande River, were the scene of a gold rush in 1893. The Good Hope and the Sylvanite mines were discovered early that spring and a ton of ore which netted $4,000 was shipped. As soon as prospectors uncovered the rich gold and silver ores, the Bear Creek gold district was organized. As the news of the mines it contained leaked out, a rush was on; men began to hurry toward the gold-bearing deposits, and to stake claims on all sides of the promising lodes.

As each new property was located—the Gold Bug, Silver Bug, Kankakee, Little May, Elkhorn, Bonita, and Chrystal—the trickle of prospectors to the high, exposed valley grew until it became a steady stream. Although the site of the deposits was only 18 miles from Silverton, the location was inaccessible even in the 1890's and could be reached from that town only by crossing Stony Pass. From the east, access was by wagon road from Creede, up the Rio Grande valley to the mouth of Bear Creek. From there, only a rough, steep trail led several miles to the prospect holes.

According to the *Creede Candle* of June 2, 1893, the road for 50 miles "is lined with prospectors, wagons and stages carrying people in and out. The greatest drawback to the camp is the want of a road from the mouth of Bear Creek to the mines. A dozen men with a team could make the road open in a day, and at the miners' meeting held the other night it was decided to do this. Nothing has been done however and probably will not be until one of the miners wants an outlet for ore."

By June 16, the camp was tentatively named Gold Run and "The Candle Company" had "established the *Gold Run Silvertip*—a weekly newspaper with A. W. B. Johnson as editor." By the end of June, it was said that "more prospectors are coming in than are going out and the town is taking shape." A townsite in a park below the falls of the creek and half a mile below the Sylvanite mine was laid out and already had two stores, a saloon, and many prospectors' tents and cabins. On the thirtieth, the *Candle* boasted: "If the present rate of growth is kept up Gold Run will be a respectable-sized camp before the snow flies. At present there are 350 to 400 persons here who are prospectors and not real estate boomers. Gold Run has a grocery store, hardware store, newspaper, blacksmith shop, boarding house, surveyor, assayor and other places of business . . . and gives promise of being a permanent camp." Some optimists even spoke of it as a "Creede Annex."

Beartown, Colorado, in the San Juan Mountains.

At first the camp was called Gold Run. However, Bear Creek, Silvertip, Hines Fork, and Cub Town were also considered as possible names. A postoffice was opened under the name Sylvanite, but by the time the postmaster received his commission, he was unable to get to his office on account of the amount of snow which obstructed the trail.

Just when the camp became known as Beartown, I do not know, but in 1948 when I visited it little except its mines were left. I approached it from the eastern side of the San Juan and Needle mountain ranges and drove from Creede up the Rio Grande valley to Lost Trail camp. From there I rode horseback up the old wagon road, over Timber Hill to the mouth of Bear Creek.

As soon as we crossed the summit of Timber Hill and started down the far side, we could look up another valley and follow the tiny sliver of trail to its end, where Beartown lay. A mile up the valley was an old stage station—a big cabin with its roof caved in. Far in the distance was another building, a lone cabin in a big meadow. At the edge of the meadow was the wreckage of a mill. The debris and the cabin were Beartown today!

Beyond the town site, the trail leads to a ford at the base of Bear Creek Falls and continues up to the Sylvanite mine and its group of buildings. The assay office was full of equipment and the hotel or boarding house was furnished with

(*Continued on page* 98)

ACTIVITIES OF U. S. MINING MEN

Franklin Gray Pardee has been elected president of the Lake Superior Iron Ore Association. Mr. Pardee, previously state geologist of Michigan, succeeds the late **M. D. Harbaugh.**

Frank E. Johnson is new deputy administrator of the Defense Minerals Exploration Administration. He has recently been serving as acting deputy administrator and also has been special assistant to the DMEA administrator. Mr. Johnson has been connected with government metal and mineral agencies for 17 years and, previous to that, worked in the industry for 13 years.

Meryl H. Geisking has been appointed to the newly created position of assistant to the president of the Tennessee Coal and Iron Division, United States Steel Company.

New instructors in the mining engineering department of the Colorado School of Mines are **Niles Grosvenor** and **Thomas G. Morrow.** Mr. Grosvenor received his M. A. from Colorado in 1952, and Mr. Morrow was employed by the New York and Honduras Rosario Mining Company, Honduras.

Alan T. Broderick of Iron River, Michigan, has resigned as regional geologist for the M. A. Hanna Company to become chief geologist with the Inland Steel Company, Ishpeming, Michigan. He previously had done geological work in Mexico and Peru, and with the Bunker Hill and Sullivan Mining Company in Idaho.

Four new directors of Washington's Delemar Mining and Recovery Company were elected recently. They are **H. N. Loding, Roy Farley, Conrad Hergert** and **W. R. Splater.**

Walter S. Palmer, chairman of the department of metallurgy of the Mackay School of Mines, University of Nevada, has retired. He had been connected with the University of Nevada for 42 years.

A. J. Windl of Oglebay, Norton & Company has been elected treasurer of the Lake Superior Mines Safety Council. He succeeds **E. W. R. Butcher,** chief mining engineer for the Republic Steel Corporation, who was treasurer of the council for 27 years.

LAWRENCE LITCHFIELD, JR., has been elected president of Alcoa Mining Company of New York City, and of Surinaamsche Bauxite Maatschappij in Paramaribo, Suriname, both subsidiaries of Aluminum Company of America. He succeeds Frank B. Cuff who has retired. Mr. Litchfield has been serving as vice president of both of these firms. He is a veteran of 27 years of service with the company, having joined ALCOA in 1925 as geologist and mining engineer. He is also president and director of Alcoa Exploration Company.

Harold Worcester has resigned as vice president and general manager of King Leasing, Inc. at Ouray, Colorado. He is now a consulting engineer, with headquarters in Montrose, Colorado.

Theophilus M. Rizzi, June graduate of the South Dakota School of Mines, is a new geologist for Homestake Mining Company in Lead, South Dakota.

Richard A. McDonald, employed by the Crown-Zellerbach Corporation in San Francisco, was recently appointed director of the National Production Authority. He succeeds **Henry Fowler,** who now is head of the Office of Defense Mobilization and of the Defense Production Administration.

Clarence H. Sleeman has been appointed general mining engineer of the Jones and Laughlin Steel Corporation, Minnesota Ore Division. The former assistant chief engineer will make his headquarters at Virginia, Minnesota on the Mesabi iron range.

Hollis G. Peacock has resumed his position of geologist for the United States Smelting, Refining and Mining Company in the Utah area. Mr. Peacock's headquarters will be in Salt Lake City for a year, after which he will transfer to Boston, Massachusetts.

Rip V. Thompson, former mill superintendent for Utah's Metal Producers, is now metallurgist for Manganese, Inc., at Henderson, Nevada.

At the Oliver Iron Mining Division, United States Steel Company, **John B. Parden** has been promoted from maintenance engineer to locomotive repair foreman of the Virginia district mines. **W. J. Belobraidich,** mining engineer with Oliver Iron, has been transferred to Ironwood, Michigan from the Hibbing-Chisholm district. New Oliver appointments include **Donald Van Prooien** and **David B. Olin,** civil engineers, **Eildon C. Ferreiro,** geological engineer, and **Rodney Bleifuss,** geologist.

New directors for the Pilot Silver-Lead Mines, Inc. of Wallace, Idaho are **O. L. Jones, James Doyle, Jr.** (president of the board), **Piatt Hull, C. W. Bentley** and **William E. Cullen. William A. Calloway** was appointed secretary-treasurer. **James A. Allen** and **L. G. Smith** have resigned as president and secretary, respectively.

James R. Carr, mining engineer, and **Harold R. Hayes,** mechanical engineer, are new additions to the staff of U. S. Gypsum Company in South Dakota.

J. R. Rand, geologist for the Copper Range Company, has moved to Ontonagon, Michigan, where he will devote most of his time to the White Pine copper mine development.

Robert Sayre has resigned as engineer for Minerals Engineering Company, Grand Junction, Colorado, and is now employed as mining engineer at the Climax Uranium Company in Grand Junction.

H. M. (LINDY) LINDHOLM has been sent to the Union of South Africa by the U.S. Atomic Energy Commission to advise on the extraction of uranium from gold mine tailings. Before joining the staff of the AEC, he had been a metallurgist for the Anaconda Copper Mining Company at its lead-zinc flotation mill at Darwin, California.

E. W. Geist, formerly in charge of M. A. Hanna Company's Groveland pilot plant at Randville, Michigan, has returned to the company's research laboratory in Hibbing, Minnesota after completing the test run at Randville.

J. R. Gross has been appointed mining engineer at the Wentworth mine of Jones and Laughlin Steel Corporation, Minnesota division. **R. H. Ledin** has been transferred from Jones and Laughlin's Hill-Annex mine to the new Lind-Greenway mine east of Grand Rapids, Michigan. He has been succeeded by **Jean Lentz.**

Dale S. Strand is a new addition to the mining engineering staff of Cleveland Cliffs Iron Company in South Dakota.

R. G. Sullivan, vice president and general manager of Minerals Engineering Company at Grand Junction, Colorado will leave the United States on December 1 for a trip to Australia, Tasmania, and New Zealand. While in Australia he will advise the Australian government, the Australian Department of mines, and joint United States-Australian atomic energy groups on uranium prospecting techniques. Special emphasis will be placed on diamond and non-core drill holes for sampling. Mr. Sullivan has had wide experience on the Colorado plateau and is a pioneer in the development of long-hole drilling and sampling there.

S. E. Erickson has been elected chairman of the minerals beneficiation division of the Minnesota section, American Institute of Mining Engineers.

J. Frank Sharp is new chief geologist for Consolidated Coppermines Corporation of Nevada. Mr. Sharp has been with the firm for 15 years, and during the past year served as exploration superintendent.

New employees of the Oliver Iron Mining Company in Lead, South Dakota are **Robert Kooiman,** general engineer; **Douglas Brackwell,** metallurgical engineer; **Robert O. Biddle, Martin T. Giavelli, Thomas Mohr, Grove A. Rathburn** and **Harold F. Unger,** mining engineers.

Kenneth R. Hama has been appointed works metallurgist at the

Duluth plant of the American Steel and Wire Division of the U. S. Steel Corporation. He succeeds **Robert C. Weed**, who has retired.

Edward C. Colson, sales engineer for Arizona Equipment Sales, Inc., Phoenix, Arizona, was recently elected to membership in the American Institute of Mining and Metallurgical Engineers.

New employees of the E. J. Longyear Company in Minneapolis, Minnesota are **Arthur Nelson** and **George Murray**.

Marshall Haney, mining engineer from Takoma Park, Maryland recently completed the examination of several manganese deposits located in Virginia and Tennessee.

Paul Hoeft has been appointed master mechanic at the Anvil-Palms iron mine, Ramsay, Michigan. He succeeds **Albert Beissel**, who has retired.

Luther R. Branting, works manager of Alcoa Mining Company's Bauxite, Arkansas operations, has retired after actively serving with the company for more than 32 years. He has been succeeded by **J. Thad Watters**, who has been assistant works manager since March.

Merlyn G. Woodle, assistant superintendent for the Republic Steel Corporation, Mesabi range, at Hibbing, Minnesota, recently returned from a trip to the Bomi Hills iron mine in Liberia. Republic has extensive interests in that country.

D. G. Malherbe, mining engineer for the Union of South Africa government, recently visited the United States to confer with technical officers of the U. S. Atomic Energy Commission regarding the uranium program of the Union. Within a few years South Africa will be the largest producer of uranium in the world.

New officers of Colorado's Clear Creek Metal Mining Association are **Major Ellis P. Lupton**, president; **Douglas Watrous**, vice president; **Charles Trask**, secretary, and **Harry Walder**, treasurer.

Morris V. Mielke, former assistant concentrating engineer at the Oliver Iron Works research laboratory, has been appointed superintendent in charge of the company's Extaca plant (experimental taconite agglomeration plant) at Virginia, Minnesota.

Ernest F. Bean, Wisconsin state geologist since 1925, has retired. He had been with the Wisconsin State Geological Survey since 1917.

Professor George P. Schubert, member of the mechanical engineering department at the Michigan College of Mining and Technology, has retired after being a faculty member for 30 years.

First officers of the recently-organized Iron County Engineers' Club in Michigan are **Philip D. Pearson**, president; **Jack Morrow**, vice president; **Richard Brewer**, secretary, and **John Torreano**, treasurer.

Warren E. Fisher, who has been head of the geological department of Inland Steel Company since 1946, has resigned to undertake the job of exploring Kennecott Copper Company's new central district. As field engineer, Mr. Fisher, and **C. H. Burgess**, district geologist, will explore an area reaching from Canada to Mexico and from the Rocky Mountains to the Appalachians.

JAMES A. RABBITT, Inco consulting engineer, and an authority on Japan and the Far East, has retired from active service with The International Nickel Company, Inc. after more than 22 years of service. He will be available in an advisory capacity on Far Eastern affairs. During World War II, Mr. Rabbitt served in the U.S. as technical consultant on Japanese industries and was also a member of the Panel of Far Eastern Experts in Washington.

Anton Tancig has resigned as mechanical superintendent for Minnesota's Snyder Mining Company after 44 years of service. He is credited with having been first to suggest electric power shovels for Mesabi open-pit mines, classifiers in its washing plants, and electric motor-driven tugger hoists for its underground mines.

W. R. Herrmann is now metallurgist at the American Steel and Wire division plant of the United States Steel Corporation in Duluth, Minnesota.

Henry Ford, mining engineer with the Verona Mining Company, is now assistant mining captain at the Buck mine of Pickands, Mather and Company.

O. H. Strand is a new vice president for William H. Ziegler Company of Minnesota, succeeding **Larry T. Gavin**, who has retired.

N. J. Knickerbocker is one of three partners who are operating a lead-zinc mine at Rico, Colorado.

Former resident Engineer **Howard T. Caddy** has resigned from the Minnesota Ore Division of Jones and Laughlin Steel Corporation. **William Betzler**, chief mining engineer at the Longyear mine in Hibbing, Minnesota, has been transferred to the Schley-Pettit mines at Gilbert. All are properties of the Jones and Laughlin Minnesota Ore Division.

Dr. Victor T. Allen, director of the geology department at St. Louis University, has received a grant from the Geological Society of America to study pyroxene, a hard, tough rock with no commercial use which often is found in zinc, iron, and other ores. Dr. Allen gathered specimens last summer in New Mexico and Mexico, and will spend the winter analyzing them.

Gordon R. Wynne has been appointed assistant superintendent of the Extaca plant of the Oliver Iron Mining Division at Virginia, Minnesota. **Morris Mielke** is superintendent.

Ernest R. Gustafson, former chief of hydraulics and international water control at the Duluth, Minnesota office of the Corps of Engineers, is now stationed at the St. Paul, Minnesota office.

Dr. Cyril Stanley Smith, former member of the Manhattan Project, will be awarded a Francis J. Clamar medal by The Franklin Institute of the State of Pennsylvania for his metallurgical contributions to the development of atomic energy during and since World War II. Dr. Smith, professor of metallurgy and director of the Institute for the Study of Metals at the University of Chicago, did research on the metallurgical behavior of elemental plutonium.

New officers and directors were elected for the Great Eastern Mining Company of Silverton, Colorado. They are: **Art Linkletter**, chairman of the board; **Allen Chase**, president; **Edward P. Chase**, executive vice president and general counsel; **Dr. T. B. Morgan**, vice president; **George Newton**, director; **William A. Way**, local counsel; **William L. Chase**, secretary and treasurer; **E. T. Chase**, comptroller; and **Carl Larson**, assistant secretary and chief accountant.

Ernest R. Gordon has been appointed chief of the Grand Junction exploration branch of the Atomic Energy Commission, transferring from AEC's New York staff. He follows **Thomas W. Oster**, who has gone to Australia to assist in uranium development.

Louis P. Gaggini is new chief of the Colorado uranium division of J. R. Simplot Company. Mr. Gaggini, who will make Grand Junction his headquarters, has been employed by the Dulaney Mining Company for the past nine years.

Guinn E. Metzger, a 1948 graduate of the Colorado School of Mines, has been awarded a Fulbright scholarship to study at the Royal School of Mines, University of London. Mr. Metzger recently was assistant professor of mining and metallurgy at the University of Alaska.

Dr. Ernest W. Greene has been elected executive vice president and director of research of Minerals Separation North American Corporation, a firm headed by **David E. Lilienthal**. **Earl H. Brown**, co-inventor of Minerals Separation's processes for treatment of low-grade iron ore, is his new assistant.

J. W. Ribotto has been named metallurgical engineer at the Magna concentrator of the Utah Copper Division, Kennecott Copper Corporation, succeeding **C. G. Williams**, who has retired. **John L. Moore** is now general mill foreman at the Arthur mill, and **Elmer C. Speers** is grinding and flotation foreman.

J. E. Papin, an employee of Phelps Dodge since 1927, is the newly appointed concentrator superintendent of the Morenci Branch of Phelps Dodge Corporation in Morenci, Arizona. He succeeds **H. T. Herivel** who has been named consulting metallurgist for Morenci.

Harold Kirkemo, mining geologist, has resigned from the staff of Anaconda Copper Mining Company's Spokane, Washington exploration office to accept a position with the U. S. Geological Survey. He will be assigned to the USGS Spokane regional office, and will work on the defense minerals exploration program.

Robert S. Palmer, executive secretary of the Colorado Mining Association and one of the founders of the United States Gold Committee attended the International Monetary Conference meetings held in Mexico City, Mexico early in September. The well-known expert on gold and silver represented the groups at the meetings.

ADVANCES IN MINE MECHANIZATION

Miners at the Metal Show heard in the technical sessions how mechanical equipment operated, and then actually saw it operate at exhibition booths

Mine mechanization and mine equipment development are not static in the United States.

Faced by today's rising costs and the lessening grade of deeper ore bodies, mining engineers and equipment designers have cooperated with machinery companies in developing and building mechanized mining equipment for the newest mining techniques.

This was the report of operators and engineers at the metal mining show and exposition of the Western Division of the American Mining Congress held in Denver, Colorado, late in September. Over 150 equipment manufacturers and suppliers displayed their latest equipment to backup the operators' reports.

Many technical reports were presented to describe progress in mechanization, open-pit mining, shaft sinking, roof support, milling procedures, prospecting and exploration, new metallurgical processes, and rock drilling.

Of greatest value to those in attendance was the fact that after hearing how a specific piece of equipment was used they could walk to the display section and see, examine, and operate the equipment themselves.

Abstracts of several of the papers which were of widespread interest follow.

Drilling Progress At Homestake

By C. N. Kravig, Mine Supt.
Homestake Mining Company
Lead, South Dakota

The Homestake Mining Company has engaged in a fairly comprehensive testing program on drills, drill bits, rods, and drilling for the past five years.

After five years of testing, tungsten carbide bits have been adopted in all drifting and raising and are being adopted in stopes as rapidly as the drifters can be replaced by lightweight hand-held drills and air legs. Tungsten carbide bits have replaced the one-use bit in all applications. The change was not based on the cost per foot drilled (which has been higher) but because of greater production per man shift and therefore better cost per ton. Costs per foot drilled with $1\frac{3}{8}$-inch tungsten carbide bits and $\frac{7}{8}$-inch hexagonal drill rods are improving with experience. Recently we started an 8 by 8-foot drift with lightweight hand-held drills and air legs combined with $1\frac{3}{8}$-inch tungsten carbide bits. This is the same equipment used in stopes. Results to date are satisfactory, and this lightweight equipment may well replace drifters in the near future. This equipment permits a complete cycle of mucking, drilling, pipework, trackwork, and blasting in one shift. Rate of advance is eight feet per eight-hour shift. Use of tungsten carbide bits in raise work with a greater drilling speed has permitted a longer round with a one-shot blast and a complete cycle in one shift. Experimenting with lightweight stopers and $1\frac{3}{8}$-inch tungsten carbide bits is scheduled for the near future.

Homestake has recently changed from one-use steel bits in combination with $3\frac{1}{2}$-inch drifters and one-inch Q.O. drill rods to lightweight hand-held drills and pneumatic legs combined with $\frac{7}{8}$-inch collared hexagonal drill rods and $1\frac{3}{8}$-inch tungsten carbide bits. This new lightweight equipment has increased production materially. Total footage drilled in a shift has increased over 50 percent, and contract earnings have increased substantially with less physical effort. Air consumption is cut nearly 50 percent.

Results to date show substantial increases in production. Miners prefer new equipment since it materially increased their contract earnings with less physical effort on their part.

Truck Haulage As Used At Southwest Copper Mines

By H. C. Weed, Asst. Gen. Mgr.
Inspiration Cons. Copper Co.
Inspiration, Arizona

Ten copper mines, Castle Dome, Cananea, Bagdad, Inspiration, Ray, Bisbee East, Copper Cities, Morenci, Ajo, and Chino, in the southwestern United States and northern Mexico are using trucks in some phase of open-pit mining. At present 173 trucks move an average of 262,500 tons of material each day, or an average of 1,517 tons per truck per 24-hour work day. Assuming 307 work days per year, over 80,500,000 tons will be moved by trucks at these 10 mines in 1952.

The pay load of the trucks in use varies from a low of 15 tons for a few of the older trucks to 45 tons for two Tournarockers which are used as trucks in one mine. The majority carry a pay load of from

"Times Have Changed" was the theme of the Atlas Powder Company. Today's modern blasting agents were unimagined only a few years ago.

22 to 35 tons with all of the newer trucks carrying 30 or more tons.

Buda, Cummins, General Motors, and Hercules Diesel engines are used in the trucks with Cummins being in the majority. Allison gasoline engines are used in the Tournarockers. All trucks are rear dump and all have power steering. Torque converters are used in 76, or approximately one-third, of the trucks. The makers of converters are almost evenly divided among Allison, Schnieder, and Twin Disc. Only one operation is without at least one truck equipped with a Torque converter, and this operation reports Torque converters on order for all of their trucks.

All operations load trucks on both sides of the shovel. Six of the 10 companies use a pit man or a spotter at the shovel. The duties of this man include cleaning rocks from under the tires before starting the truck and cleaning rocks from the truck pattern before backing in a truck, as well as responsibility for the proper spotting of the truck. At the waste dump a berm is maintained at six operations and seven keep a pit man or spotter at the dump. In some cases the man also acts as a sampler. In four of the pits, right-hand driving is standard, while two report left-hand drive as standard. The four others drive either right or left as local conditions indicate advantages. No difficulty from a safety angle was reported by these last four mines. The average length of haul ranges from a low of 0.3 miles to a high of 2.5 miles, and the grades on the haul from a low of 3.0 to a high of 18.0 percent.

Tires are an important item of cost in truck service. Tire life as reported in miles ranges from a low of 10,000 to a high of 22,500. This varies greatly with the single rear-axle truck and the dual-axle truck which carries four more tires per truck. It is interesting to note the highest averages are reported by companies who use dual rear axles exclusively and the lowest from those using single rear axles exclusively. On the basis of an estimate, it would appear that the total tire cost per mile does not vary greatly between the two types of trucks. Recapping of tires is standard practice of eight companies. In recent years the cost of a recap has not risen as rapidly as the cost of new tires which favors recapping. It is, however, essential that a tire be recapped before the carcass is damaged and a tire which requires too many section repairs will not ordinarily pay out the cost of the repairs and the recap.

Rock Bolting at Sunshine

By W. B. Foster, Engineer
Sunshine Mining Company
Kellogg, Idaho

To date, some 5,000 bolts have been used at the Sunshine mine, and, with one exception, every use has given the support expected. The one exception involved a stope that had been mined to the height required for the first gob. Some 50 bolts were driven in the hanging wall of the first two floors, but since this stope had been in operation several months before the bolts were installed, the hanging wall had become loosened to such a depth that bolts were not effective.

On February 18, 1952 the first rock bolts used at Sunshine were driven on the 3,250 No. 4 winze station. This station had been enlarged and would have required station sets to support 600 square feet of open ground.

120 bolts, one inch in diameter by six feet in length, were used with ⅜ by 8 by 8 inch bearing plates, and the nuts set to the maximum with an I. R. 534 Impact Wrench. An R 38 stoper was used for the drilling and both drilling and bolting were done by a timber repairman and his helper. This has become the standard crew for the work.

On this particular job, the bolting pattern was required to support 25 square feet of ground for every five bolts. To date, the ground is secure and no ground has sloughed from the bolted area. This same pattern of bolting has been used on all station bolting and has given the service expected.

Rock bolting in drifts and crosscuts was started soon after the station work was well underway. The hanging wall and footwall of drifts consist of silicified St. Regis quartzite, laid in beds four inches to two feet in thickness. Drifts, in general, strike east and west, with the veins and accompanying shearing dipping 70° to the south. The shear zones in which the veins occur are along the steeply dipping north limb of the Big Creek anticline. The bedding therefore in general dips 80° and steeper to the north with occasional slight overturning. The combination of the north dipping beds and the south dipping schistosity intersecting at a maximum angle of 30° produces a weak, slabby hanging wall. The bedding has a tendency to become loosened through exposure and shock, and large slabs slip or fall into the drift.

To overcome this condition, six-foot bolts were installed in a fan-like pattern. The bolts are placed at centers of approximately 2½ feet on the cross section of the drift and each fan-like pattern is placed at centers of four feet along the length

LEFT: The Buda Company displayed its heavy-duty Diesel engines. CENTER: An operating plastic scale model of the new Concen-Tank thickener is shown in the foreground at the booth of the Morse Brothers Machinery Company. RIGHT: The Dings Magnetic Separator Company displayed the world's newest tramp iron magnet, and a scale model of the largest tramp iron magnet.

of the drift. Each fan consists of six bolts, beginning at hip height on the wall and extending up the wall, across the back, and down the other wall. In some cases it is necessary to add one or more bolts to give the required support. This pattern has given remarkable service under the most severe conditions.

On July 16, 1952, a severe rock burst occurred in the vicinity of the 3,700 and 3,840 levels of the Sunshine Mine. On the 3,840 level, a section of the cross-cut, 100 feet in length, had been bolted. The same fan pattern of bolting had been used, with an occasional bolt between each bolted section. The rock burst knocked down a large amount of rock along the cross-cut, but within the bolted section, no rock was loosened nor had fallen. This section of cross-cut was thoroughly examined for broken or loose bolts. None were found.

Inclined Shaft Mucking

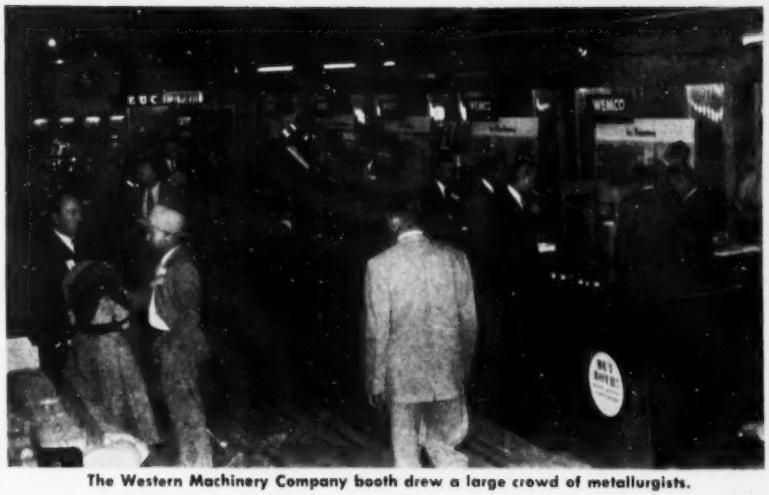
By F. W. Sauerwein, Engineer

New Jersey Zinc Company
Ogdensburg, New Jersey

The northward extension, in depth, of the Sterling ore body required the sinking of an auxiliary underground shaft. The sinking of the lower portion of this inclined shaft led to the development of a mechanical mucking method that proved itself beyond expectations.

The North ore body shaft is a three compartment, 52° slope of 8 x 18-foot cross section, extending 1,045 feet below the 1,850 level. The 52° pitch of the shaft ruled out any application of scraper and slide loading directly to a skip, while the limited shaft dimensions, both as to length and headroom, made difficult the use of scraper and loading pan or bucket. Consideration was given to an inclined shaft mucker embodying the principle of an undercutting shovel bucket, as well as a recently developed machine with a bucket operating in a manner similar to a clamshell. In the operation of these muckers, it was felt that the necessity for hoisting each bucketful to the dumping point through a distance of over 1,000 feet, or intermediate muck transfer, was a definite disadvantage.

The final mucking method evolved consisted, in principle, of a dragline bucket. A toothed-lip bucket was designed and constructed in the shops at minor expense and operated experimentally on the muck pile produced by initial sinking at the 2,450 level. The 13-cubic-foot bucket is 18 inches high by 30 inches wide with top and bottom lengths of 42 and 48 inches, respectively. Pull and tail ropes are hooked to either end and the bucket is hoisted through a stationary sheave located at the front.



The Western Machinery Company booth drew a large crowd of metallurgists.

From the first trial runs it was evident that the bucket could be filled efficiently, one or two passes being sufficient in most cases, and, with the exception of a counterweight added to the rear to prevent overturning, no major alterations to the original design were required. A 20-foot-long sinking cage was constructed consisting of a wheeled chassis containing three built-in steel platforms. On these were mounted three air-driven hoists, a single drum at the upper and lower platforms and a double drum at the center.

When operating, the cage is positioned on the 42-inch-gauge shaft track in the center compartment and 10 to 30 feet above the muck pile, depending on the cycle. The regular 50-cubic-foot ore skip operates on the second track and is so placed that its top is level with the lower end of the cage. All cables from the hoists pass through rope blocks hung from pins secured in the shaft hanging wall directly above the lower end of the cage.

The ropes from the double drum hoist, after passing through the hanging wall blocks, continue down to blocks located at either end of the shaft a few feet above the muck pile, the pull rope to one, the tail rope to the other, thence to the front and rear of the bucket. As the muck pile recedes, the blocks at the shaft ends are lowered not more than twice during the mucking cycle. The cable from the upper hoist, after passing through the hanging wall block and the sheave at the front end of the bucket, is dead-ended to a pin in the hanging wall adjacent to the rope blocks.

In loading, the bucket is pulled through the muck pile until filled, then pull and tail ropes are disconnected by means of open hook attachments, and the upper single-drum hoist raises the bucket to the dumping position.

The cable from the lower hoist, passing through one of the overhead blocks, is then hooked to the rear of the bucket, while a fixed chain, suspended over the skip, is attached to the bail. With proper manipulation by the operators of the upper and lower hoists, the lip of the bucket is lowered to rest on the edge of the skip, the bottom is raised, and the muck discharged into the skip without spillage.

During the mucking cycle, cage stability is insured by means of a small demountable screw jack braced against the hanging wall, while the upper end of the cage is pinned to the footwall. It was found that three or four shaft rounds could be mucked from the same equipment set-up before bucket hoisting distance became excessive.

In the mucking cycle, four buckets were required to fill each skip and the record attained in one shift of seven actual working hours was 46 skips—approximately 220 cubic feet of muck, or one skip every nine minutes. This entailed hoisting 184 buckets at slightly over two minutes per bucket. Experience indicated that insofar as the mucking cycle was concerned, five or even four men would have been sufficient since on several occasions the absence of one man from the crew caused no appreciable loss of efficiency.

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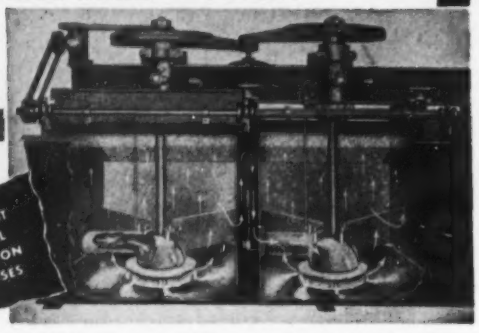

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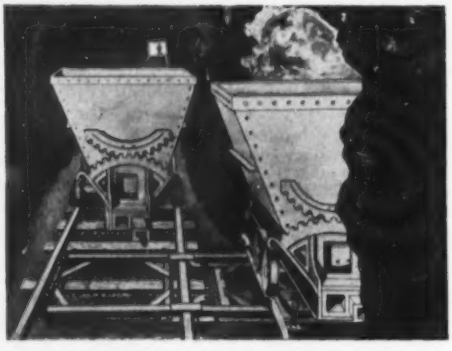

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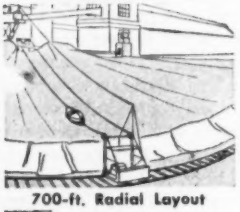
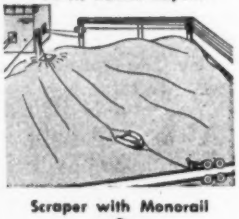
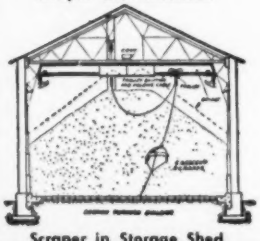


700-ft. Radial Layout



Scraper with Monorail



Scraper in Storage Shed

ACTIVITIES OF INTERNATIONAL MINING MEN

STUART H. STUBBS is owner-manager of the Comet gold mine at Marble Bar in Western Australia. Marble Bar is one of Australia's most isolated mining areas, and is also distinguished as one of the hottest. The record is more than 160 consecutives days with temperatures of over 100°. Mr. Stubbs recently visited Victoria and New South Wales. He currently plans to open up some copper deposits such as the Whim Creek mine.

Claude W. Courand has been appointed director of the Defense Materials Procurement Agency's new office in Lima, Peru. Holding the rank of Minister of the United States, Mr. Courand will direct DMPA's activities throughout South America, except in the Guianas. DMPA has one other office outside the continental United States, the Region III office in London, England, which is headed by **Brigadier General Thomas B. Wilson.**

Three British mining men from the Phosphate Development Corporation, Ltd., of Pretoria, Union of South Africa, recently toured the Florida Phosphate Division of International Minerals and Chemicals Corporation. The group, which included **Gustav S. Preller,** manager, **B. M. Van Bergen,** mining engineer, and **D. J. du Plessis,** chief chemist, received a first-hand briefing in the processing and mining of phosphate rock. The British firm has been prospecting for phosphate for seven years, and expects to begin mining and processing within two years.

J. F. (Jack) Findlay, Mexican representative of Howe Sound Company for the past 14 years, has retired and is now at Madeira Beach, Florida. He has been succeeded by **Bryan W. Brown** of San Luis Potosi, Mexico.

John R. Paris is new general manager and chief engineer of Eastern Mining and Metals Company, Ltd., Bukit Besi, Dungun, Trengganu, Federated Malay States. He formerly was associated with the Malayan Collieries, Batu Arang.

W. P. Ryan, former mine superintendent of the Siglo XX mine property of Patino Mines and Enterprises Consolidated, Inc., is now employed by the Cerro de Pasco Corporation in Peru. **K. O'Donnel** succeeds Mr. Ryan.

R. Cornwaite is new underground manager at Chibuluma Mines, Ltd. at Mufulira, Northern Rhodesia. He previously was a foreman at Roan Antelope Copper Mines, Luanshya, Northern Rhodesia.

Charles Will Wright, American specialist on foreign mines, recently flew to Brazil for consultative work. He also completed a trip to Mexico this fall, where he and his associates are developing manganese, iron and fluorspar properties.

Ernest Fraenkel was recently elected chairman of the board of directors of South American Minerals and Merchandise Corporation, New York exporting and importing representatives of the Hochschild interests in Peru, Bolivia, Chile, Argentina, and Brazil. Mr. Fraenkel has been with the company since it began in 1947 and formerly was with Watson Geach and Company, Inc. He succeeds **Paul Linz.**

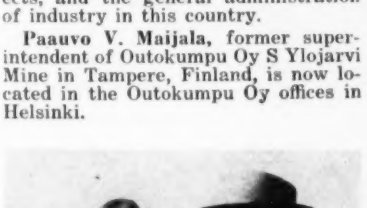
Francisco Donis Ortiz, mining engineer for Nueva Montana Quijano, Santander, Spain, has been awarded the prize for the best metallurgical article in the recent contest sponsored by Mineria Y Metalurgia, publication of the Spanish mining engineers. In the mining division there were two winners, **Santiago Garcia Guente** and **Ramon Fernandez Soler.**

J. C. Nixon is new superintendent of metallurgical research for Consolidated Zinc, Ltd., Broken Hill, New South Wales, Australia. He previously was senior lecturer in ore dressing at the University of Melbourne.

John M. Russell is new field manager for the Nosterman Gold Mines, Ltd. and Bewick Moreing and Company, Kabale, Uganda, British East Africa. Mr. Russell, now prospecting for and developing tin and wolframite deposits, was formerly located at Kakamega, Kenya.

Dr. F. Meyer, chairman of the South African Iron and Steel Industrial Corporation, Ltd., recently made an extensive tour through the United States and Canada to study problems relating to development of the iron and steel industry. He observed labor-management problems, housing projects, and the general administration of industry in this country.

Paauvo V. Maijala, former superintendent of Outokumpu Oy S Ylojarvi Mine in Tampere, Finland, is now located in the Outokumpu Oy offices in Helsinki.



THEODORE KROLL and HECTOR ROBINET of the Societe Metallurgique de Hoboken in Belgium visited Australia recently. Among the operations they inspected were smelting and refining plants at Port Pirie, South Australia, and Port Kembla, New South Wales.

The Honorable J. G. Arthur, minister of mines, New South Wales State Department of Mines, recently toured major cities in the United States to seek technical information on U. S. mining and mining operations.

Fred E. Towsley, chief field geologist for the Kennecott Copper Corporation's South American division, is now in Lima, Peru. Mr. Towsley formerly worked in Colquiri, Oruro, Bolivia.

Kiichi Murakami, former chief engineer for the Sika Mining Company, Ltd., of Tokyo, Japan, is now adviser to the Sumitomo Metal Mining Company, Ltd., also of Tokyo.

K. L. Brindsden, general manager of the Croesus Proprietary Treatment Company, has moved from the firm's London office to Fimiston, Western Australia. Mr. Brindsden also serves as consultant to South Kalgurli Consolidated, Ltd., in Crawley, Western Australia.

Waldemar Zeidler is now a mining engineer for Svenska Skifferolje AB in Narkes Kvarntorp, Sweden. He formerly worked for V Sund in Nora, Sweden.

John C. Russell is the new chief research metallurgist for Rhodesian Anglo American, Ltd. at Kitwe, Northern Rhodesia. He has resigned from his position with the consulting engineering department of The Dorr Company at Stamford, Connecticut.

Colin York Syme is new chairman of directors of the Broken Hill Proprietary Company, Ltd., Melbourne, Australia. The 49-year-old executive, youngest man on the board, succeeds **Essington Lewis** who is retiring from active leadership of the board to assume an advisory capacity.

O. D. Niedermeyer has been appointed assistant general manager of the Nickel Processing Corporation at Nicaro, Cuba. The Nicaro operation is owned by the United States government, but National Lead Company has a majority interest. **John C. Archibald, Jr.** succeeds Mr. Niedermeyer as manager of the Texas Mining and Smelting Division of National Lead.

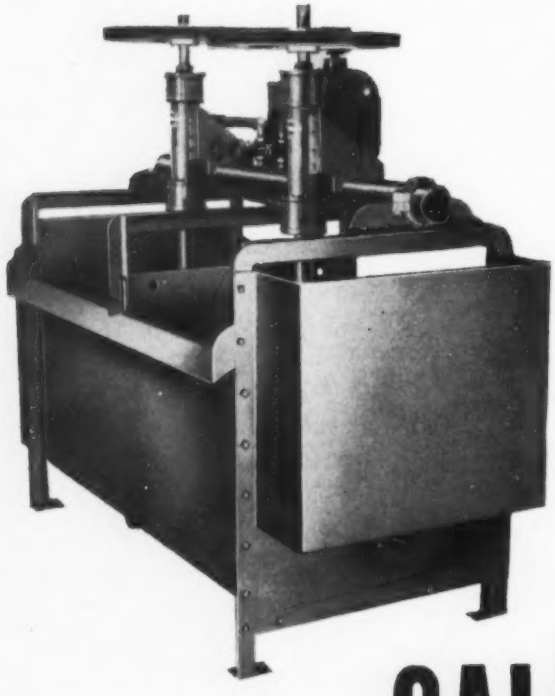
Harvey J. Hakala, former head of U. S. Steel Company's Brazilian subsidary, Companhia Meridional de Mineracao, has left the southerly manganese mining firm to resume his post in the mining engineering department of Oliver Iron Mining Division in Duluth, Minnesota.

Erik A. Schwalbe, employed by Stora Kopparbergs, Bergslag Aktiebolag, Blotberget, Sweden, has won a scholarship for six months' study in the United States on concentrating low-degree iron ore.

Per Gudmar Kihlstedt, former general superintendent of metallurgical operations for Bolidens Gruvaktiebolag, is a new professor of metallurgy at the Royal Institue of Technology in Stockholm, Sweden.

ARIZONA and AGITAIR is there!

highly efficient flotation... copper and copper-zinc.



The plant shown above—located in Arizona—is a typical concentration mill, of 1500-ton daily capacity, with separate flow sheets for copper ore and copper-zinc ore. AGITAIR is used exclusively in this modern mill and is given large credit for a profitable operation.

AGITAIR Flotation is serving in every metal state of the union and in every major metallurgical region throughout the world. The famed machine has achieved this universal acceptance for one basic reason: HIGHER RECOVERY AT LOWER COST!

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INTERNATIONAL NEWS

Glenn McCarthy To Operate Bolivian Sulphur Mines

Glenn McCarthy, famous Texas oil man, has signed a $3,000,000 investment contract with the Bolivian government for a sulphur mining concession in the Department of Potosi in southwestern Bolivia, just north of the Chilean border. Under terms of the concession, the Bolivian government will receive eight percent royalty on the gross value of exported sulphur.

According to reports, the new sulphur mining firm will not be required to give the Bolivian Banco Central the foreign currencies received for sulphur sales, nor will there be any limit upon quantities and destinations of exports. Initially, shipments are being made to Brazil at a price reported to be $140.00 per ton.

The concession is in one of the world's highest mining districts—5,970 meters or almost 20,000 feet altitude—where miners can only work four hours per day in the extreme cold and wind. Camp is at an elevation of about 5,000 meters (16,400 feet). Llamas are used to transport the sulphur from the mines to the camp where a small melting plant is operated.

Bagdad To Expand Mining And Milling Facilities

An $18,000,000 expansion program has been undertaken by the Bagdad Copper Company to increase mining and milling facilities at its properties in the Eureka mining district of Yavapai County, Arizona. Value of the metals extracted from the mines is expected to be increased from $6,200,000 during the past year, to $23,000,000 by 1954. Of this amount, $12,000,000 will be in copper, $1,000,000 in zinc, and $10,000,000 in tungsten ores.

The expenditures will be mainly for new equipment to handle increased production of copper, zinc, and tungsten. Two mines and their nearby mills are involved; one is at Bagdad where copper and small amounts of gold are open-pit mined, and the other is at Hillside where an old underground lead-zinc mine had been reopened as a tungsten mine.

A new housing project is now under construction, while improvements are under way on the 22-mile highway which links Bagdad and Hillside.

Agreement To Develop Canadian Asbestos Mine

An agreement providing for the completion of development of asbestos properties under Black Lake in Quebec, Canada, has been signed by United Asbestos Corporation Ltd. and Lake Asbestos of Quebec Limited, reportedly a wholly owned subsidiary of American Smelting and Refining Company.

The agreement grants to Lake Asbestos the right to examine United's property and operation, and to elect to equip the mine for production with a milling capacity of at least 4,000 tons of ore per day. Lake Asbestos will advance without any interest all funds for the purpose, and has already taken over all expenses in connection with operations of the property.

Monetary Fund Refuses To Act For Higher Gold Price

A move for a higher price for gold at the seventh annual meeting of the International Monetary Fund in Mexico City in September was headed by the delegation from the Union of South Africa and stoutly seconded by the Australian delegation.

Nicolaas Christiaan Havenga, Finance Minister for the Union, led the move. He argued that the time seems to be opportune for an increase in the price of gold and that many currencies now under pressure will be wrecked and with it the monetary mechanism unless gold is correctly priced.

Neither United States Secretary of the Treasury, John Snyder nor Sir Arthur Salter, British Minister of State for Economic Affairs, participated in discussions of the gold price nor in any part of the move to raise the official rate of $35.00 per ounce. Sir Arthur commented that the question would probably be considered at the Commonwealth Conference to be held in London in November.

The meeting took no definite action on the matter. The official answer was voiced by the Fund's director-manager Ivar Rooth. "Two Fund governors have spoken of the gold price. The executive directors and the personnel are convinced that this is an important question for the Fund, although there are differences of opinion about the matter, and therefore we consider it a matter that requires a more or less continued study. I can assure the governors that all points of view about this subject will be most carefully considered by the executive directors and the personnel."

The eighth annual convention is scheduled to be held in Washington, D. C.

Nicolaas Christiaan Havenga

Two Canadian Firms Agree To Provide Nickel for U.S.

Negotiations have been completed by the Defense Materials Procurement Agency with two Canadian mining firms to provide critically needed nickel for the United States.

One contract is with the East Rim Nickel Mines Limited of Toronto. The company has agreed to spend about $1,000,000 in partial development of its mines at Sudbury, Ontario, and to begin at once to mine and crush ore at a rate of not less than 3,500 short tons per month. The company has no processing facilities so, under a companion agreement, the Falconbridge Nickel Mines Ltd., also of Toronto, has agreed to process and refine the ore in its plants at Falconbridge, Ontario, and Kristiansand, Norway.

To assist in development of the Sudbury property and to augment U. S. supplies of nickel, the DMPA has agreed to purchase up to 65,000 short tons of ore. The East Rim deposit is estimated to contain over 2,000,000 tons of nickel sulphide ore.

O'okiep Copper Co. Signs Tungsten Contract with US

The O'okiep Copper Company Limited, operators of copper and tungsten mines in Cape Province, Union of South Africa, has signed a contract with the United States government for sale of all its tungsten concentrates until March 31, 1958. Under the terms of the contract, O'okiep is spending $500,000 to increase tungsten mining and concentrating facilities.

The new tungsten plant will have a capacity of 200 tons per day and will be built three miles from the copper mill. Tungsten will be recovered by tables.

The company reports a production of 47,243,000 pounds of copper for the year ended June 30, 1952, compared to 45,414,000 pounds in the previous year. Profits for the year increased to $9,374,610, compared to $5,721,946. The average price received for blister copper, largely sold in Europe, was 40.38 cents per pound. During the year, the company mined and concentrated 972,000 tons of 2.43 percent copper ore. Ore reserves were increased 30 percent last year by the discovery of the Vababeep orebody two miles west of the mine plant. They are now estimated at 17,410,000 tons of 2.43 percent copper. The Nababeep West orebody will be developed within the next five years at an estimated cost of $14,000,000. A new flotation mill may eventually be built to treat ore from this newly discovered orebody. A geophysical survey is now underway in the district to delimit indicated orebodies and to try to discover new ones.

The Newmont Mining Corporation owns 56.3 percent (575,103 shares) of O'okiep and values this stock at $25,879,365. On December 31, 1949, the stock was valued at $9,201,648.

PRODUCTION AT KILEMBE COPPER-COBALT MINE SCHEDULED TO START IN 1955

Kilembe Mines, Ltd., big copper-cobalt mine in Uganda, should be ready to start production in 1955, according to latest reports. It is understood that negotiations are nearing completion to provide the $16,500,000 needed to bring the mine into production. Meanwhile, stope development and other preparatory work is continuing, and production plant designs are being drafted.

Kilembe will begin producing at an initial rate of 2,000 tons per day, and is scheduled to produce 25,000,000 pounds of copper and 1,500,000 pounds of cobalt annually. This will rank the mine among the world's leading cobalt producers, and facilities are being designed for expansion.

Ore reserves are estimated at 15,000,000 tons with a cutoff grade of 2.0 percent copper and 0.16 percent cobalt.

When production begins, the deposits will be mined from both open pits and underground stopes. A main adit haulage level has been established at an elevation of 4,500 feet and other adits are portalled up to 5,000 feet in elevation. Ore will be transferred to the mill a mile away by surface railway, but it is anticipated that low level haulage will be established at the mill elevation.

A new, unique metallurgical process, approved by the Batelle Memorial Institute of Columbus, Ohio, has been developed to process the mine's ore. Some of the oxide ore will be concentrated and some will be mixed with the flotation concentrate to make a feed of 650 tons per day for the Dorrco fluosolid roasters. The soluble copper and cobalt oxides will then be leached from the roasted material, and electrolytic copper will be deposited from the solution. The high-grade cobalt oxide precipitate will be shipped to Wilmington, Delaware, where it will be refined into cobalt metal. The cost per pound of the copper is expected to be exceptionally low, particularly when credited with the value of the cobalt output. Gross revenue should be about $10,500,000 annually, and net profit $4,250,000.

A 208-mile railroad is being built to the mine by the Uganda government, and the Uganda Electricity Board will build a 240-mile power line to connect the mine with the new Nile River power development. An airport has already been built by the company, which is also continuing construction on a small 1,500-kva plant for use during the construction period and as a standby later. Contracts have been let by the government to rebuild roads to the mine.

AUSTRALIA—The prices of Government controlled copper, lead, and zinc rose during August and September. The new price is still below the cost of imported copper but will be most helpful to *Mount Lyell Mining and Railway Company, Ltd.* (Tasmania), and *Mount Morgan Limited* (Queensland). If the price does not fall, profits of *Mount Isa Mines Limited* (Queensland) will increase when copper production begins there next year. Australian copper output is still around 15,000 to 20,000 tons per year while consumption is about 45,000 to 50,000 tons anually. Lead and zinc prices were raised to £A 95 per ton (still considered ridiculously low by many in the field). This was an increase of £A 30 per ton. The increases affect Broken Hill (New South Wales) mining companies and the *Electrolytic Zinc Company of Australasia Limited* (Tasmania). These producers are now required to supply to the domestic market 50,000 tons of lead and 60,000 tons of zinc per year before disposing of their remaining production overseas at ruling rates (equivalent to £A 164 for lead and £A 153 for zinc). Price rises inside Australia do not affect *Mount Isa Mines Limited* (Queensland), *Lake George Mines Pty. Ltd.* (New South Wales), and other producers who already sell their output overseas.

PHILIPPINE ISLANDS—For the first time since 1946-1947, base metal production for the fiscal year 1951-1952 consisting mostly of iron, copper, chromium, and manganese, surpassed gold and silver production by more than Pesos 9,000,000. The respective production figures are Pesos 53,340,000 for base metals and Pesos 44,240,000 for gold and silver. Base metals now constitute about 55 percent of metallic production and about 40 percent of total mineral production in the islands.

NEW SOUTH WALES—Milling has started at *New Broken Hill Consolidated Ltd.* at Broken Hill. Plant capacity is 350,000 tons per year and will be expanded as production increases.

TASMANIA—*Mount Lyell Mining and Railway Company Ltd.* will explore, systematically, the mineralized country southeast of the present mining area at Queenstown. Some of Australia's wildest country occurs in southwestern Tasmania. The Tasmanian prime minister says that a survey flight has indicated uranium in this sector, and that the government would build access roads to the area if uranium were found. The state government will also add £A 11,000 to the federal government's £A 25,000 reward for discovery. Geologists claim that the area will also yield rich deposits of copper, lead, and silver. Nickel has also been reported from this part of the island.

INDONESIA—Tin ore production reached a post-war record in July with 3,394 long tons, or 430 tons more than the June figure, and almost 750 tons higher than the average for the first six months.

SOUTH AUSTRALIA—A new railway will be built to link Radium Hill with Port Pirie, where a plant for extraction of uranium salts is to be erected with United States assistance. The plant will be operated by the *Broken Hill Associated Smelters Pty. Ltd.*, a company owned by Broken Hill, New South Wales, mining companies. Abandoned copper mines in the state are being prospected for possible uranium deposits. Formerly an important Australian copper producing state, South Australia has produced little of consequence in recent years.

DRILLING OVERBURDEN IN AUSTRALIA

The blast hole drilling undertaken by Theiss Bros., Proprietary Ltd. for open-cut mining at Muswellbrook, Australia, presented one difficult problem. Much of the vertical drilling of shot holes for removal of overburden would be through hard slate and conglomerate. In spite of the unusual conditions, the company is averaging 300 feet of 6- to 8-inch-diameter hole per day. Holes average 16 feet in depth, and in some cases drilling depths reach 46 feet. The equipment responsible for this accomplishment is the McCarthy Vertical Drill, manufactured by the Salem Tool Company of Salem, Ohio. Truck-mounted and adaptable for fast road travel, the drill pivots to a reclining position when the truck is on the move.

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INTERNATIONAL

WESTERN AUSTRALIA—*New Coolgardie Gold Mines N. L.* in four weeks to August 12, produced 2,420 ounces of gold from 4,924 tons of ore. The company recently reported development at its *Callion* mine of a 196-foot length assaying 33.8 dwts. over a width of 66 inches. *Kalgoorlie Southern Gold Mines N. L.* has obtained encouraging results in recent drilling. One hole was put down to 5,729 feet, believed to be a world record for an inclined hole. The trend of gold mining costs remains upward with profits declining. Both *Boulder Perseverance Ltd.* and *Gold Mines of Kalgoorlie (Aust.) Ltd.* recently reported reduced annual profits.

QUEENSLAND—Latest figures from *Mount Morgan Ltd.* (four weeks to August 24) show that 63,350 tons were mined and milled, averaging 0.105 ounces of gold per ton and 0.80 percent copper. Mill recovery was 4,360 ounces of gold and 434 tons of copper. Sale of pyrite from Mount Morgan's dumps is at £A 3 per ton at the railhead. Pyrite is also contained in overburden at the mine. It is railed to Cockle Creek, New South Wales, for acid manufacture and capacity for production may become 100,000 tons per year. Various projects are being considered for local utilization of the pyrite.

SOUTH AUSTRALIA—The Department of Mines is engaged in designing a plant for crushing and conveyor-belt transfers in dry-crushing plants.

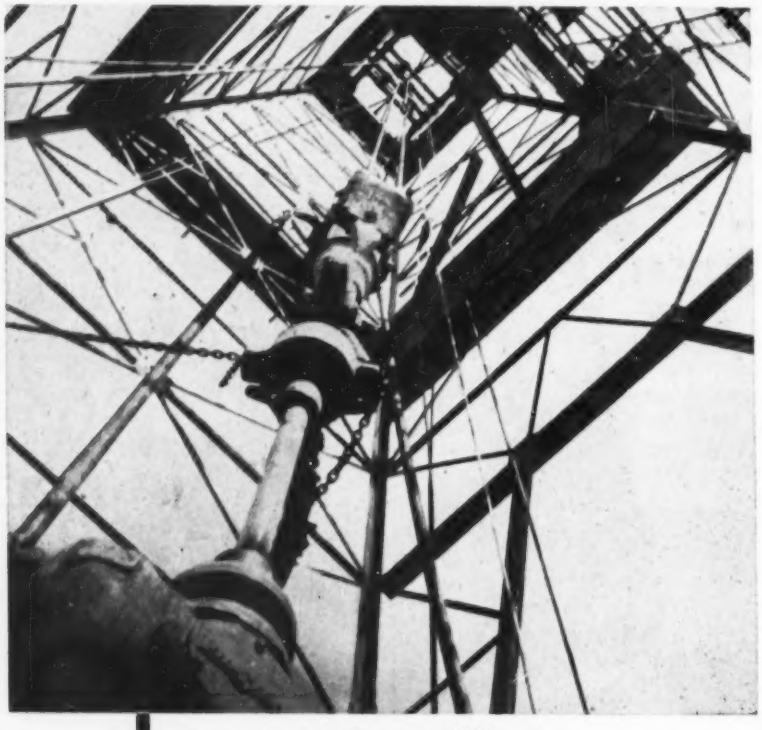
NEW ZEALAND—The *Otau* mine has supplied 500 tons of manganese ore for shipment to the United States. Previously, the ore had been going only to Australia. The Otau mine is thought to be the only manganese producer in New Zealand. It is located at the top of Ness Valley, 30 miles south of Auckland.

NORTHERN TERRITORY—*Peko (Tennant Creek) Gold Mines N.L.*, a small mining company on the Tennant Creek goldfield, has recently sent some sample shipments to the *Electrolytic Refining and Smelting Company of Australia Pty., Ltd.* at Port Kembla, New South Wales. The oxide ore carrying cuprite and metallic copper assayed 30 percent copper and 1.5 ounces of gold per ton. Sulphide copper ore assayed 28 percent copper and 1.0 ounces of gold per ton. Another small mine shipping copper ore over great distances to Port Kembla is that of *Home of Bullion Mines Pty., Ltd.*, which recently sent 500 tons assaying 16 to 20 percent copper. This ore is sulphide and the mining company plans to erect a small concentrator at Barrow Creek on the Alice Springs-Darwin highway, 140 miles south of Tennant Creek. The mill will permit treatment of 12 percent ore which at present is dumped. Ore from the *Nobles Nob* mine of *Australian Development, N.L.* at Tennant Creek, currently assays around two ounces of gold per ton. Monthly tonnage is 1,300 to 1,400.

PHILIPPINE ISLANDS—A 300,000 pesos loan from the Philippine Reconstruction Finance Corporation is being sought by the board of directors of *Demonstration Gold Mines, Ltd.* in order to step up rehabilitation of its mines in the Paracale district of Camarines Norte. The company needs additional funds to bring its *Santa Barbara* mines into milling operation. Unwatering of the mines has already been completed and some heavy machinery and equipment has been installed. Approval of the loan is awaited before the company can proceed with its rehabilitation work.

WESTERN AUSTRALIA—The second borehole sunk at the southern end of the Kalgoorlie field by *Kalgoorlie Southern Gold Mines N.L.* reached a depth of 5,700 feet. The first was sunk to 4,000 feet. At the *Blue Spec Mining Company N.L.* property, antimonial-gold concentrates are being shipped to the *Broken Hill Associated Smelters Pty. Ltd.* at Port Pirie in South Australia. *Anglo-Westralian Mining Pty. Ltd.*, which has interests in lead and gold-mining properties and which is itself 35 percent-owned by *Mount Isa Mines, Ltd.*, is reported to have inspected the Blue Spec property recently.

PHILIPPINE ISLANDS—A movement has been started to establish a bullion exchange in Manila for the purpose of trading in locally produced gold, and it is said to be gaining support from the various sections of the business community. Main purpose of the move is to stop a huge leak in the Philippine gold output through illegal exports abroad, and, at the same time, to save the local gold mining industry from possible collapse. Proponents of the plan believe that the operation of a gold bullion exchange will stimulate the mining industry through an increase in the free market price, and bolster the amount of U. S. dollars that will be made available to the Central Bank for financing imports.



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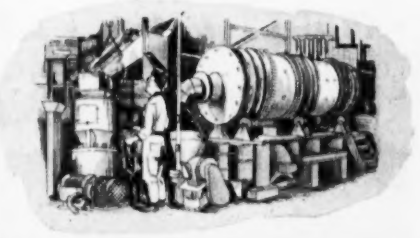
Laboratory Tests Help Quarry Operator Stop Dust Hazard

PROBLEM . . .

Dangerous silica dust was a health hazard to workers in a large eastern crushing plant. Minus 2-in. quartzite was being reduced by crushing and dry grinding to a size suitable for use in silica brick. The dust problem was acute.

WHAT WAS DONE . . .

The problem was brought to the Allis-Chalmers Research Laboratory. A series of batch tests — followed by continuous pilot mill tests — showed that the specified size analysis could be obtained by wet grinding. A flowsheet was worked out in which the quartzite was crushed in a *Hydrocone* crusher, followed by wet grinding the crushed product in rod and ball mills and blending the mill products in the correct proportions.



RESULT . . .

Guided by these laboratory tests, this quarry operator set up a wet process which eliminated a hazardous dusting condition and still obtained the specified product.

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Send for Laboratory Bulletin 07B6419A

EUROPE

FINLAND—The government-owned *Otanmaki Company* is installing 12, 66-inch Fagergren flotation cells to remove sulphides from its magnetite-ilmenite ore. Development of the mine and mill construction are well-advanced, and first production of concentrate is scheduled for 1953. Plant capacity is scheduled for 500,000 tons per year, from which 175,000 tons of high-grade iron concentrate, 75,000 to 100,000 tons of 45 percent TiO_2 concentrate, and 5,000 tons of pyrite will be recovered.

ENGLAND—*Geevor Tin Mines Ltd.* will spend some £30,638 on a new electric hoist and equipment, new steel headframe, self-dumping skips, etc. which are to be delivered before the end of the year. In the 12 months ended in March, the mine produced 57,802 tons of ore which yielded 740 tons of black tin (65 percent Sn). The proceeds of this amounted to £414,668, compared with £423,566 yielded in the previous year for the same amount of tin.

WEST GERMANY—Plans are being made to open West Germany's first titanium deposit for commercial development. The deposit is located on the coast of Sylt Island in the North Sea, and is estimated to contain about 6,000 tons of titanium.

PORTUGAL—*Beralt Tin and Wolfram Limited* has concluded another price-fixed contract with the United States to supply about 2,500 long tons of wolfram concentrate over a five-year period beginning immediately. The company concluded another agreement last May to supply the U. S. with 1,000 short tons within two years at a fixed price. Beralt owns tin and tungsten properties at Panasqueira in the province of Beira Baixa.

SWEDEN—About 8,000 tons of Swedish iron ore arrived at *Bethlehem Steel Company's* Lackawanna plant in New York State recently. The ore is reportedly of the highest grade and is used extensively in Bethlehem's steelmaking processes.

CYPRUS—During the first six months of this year, exports of copper concentrates amounted to 47,750 tons—a monthly average of 7,958 tons, compared with 8,562 tons last year. Copper pyrite exports were much greater with a total of 61,282 tons during the six-month period, or a monthly average of 10,213 tons, compared with 8,255 tons last year.

AUSTRIA—The 1951 production of antimony almost met domestic requirements. This year's production is expected to rise about 15.6 percent, making it possible to export antimony for the first time. At the same time, the Austrian Ministry for Nationalized Enterprises has announced that the demand for x-ray-grade barium and for hard lead for use in batteries can be fully met by home production.

WEST GERMANY—*Stolberger Zinc Company* plans to develop a new lead and zinc prospect in the Kuferather Valley near Dueren. Between 500,000 and 750,000 tons of metal are estimated in the area, two-thirds of which is lead and the remainder zinc. A daily ore output of 2,000 to 3,000 tons is planned, with mining from open pits and some from existing underground installations.

AUSTRIA—The copper mines produced 59,723 metric tons during the first half of 1952. Compared with production during the same period of 1951 which was 38,451 tons, this represents an increase of 55.32 percent.

ITALY—The Official Gazette has published a special decree which authorizes the suspension of all duties on some ore flotation reagents which are not manufactured in Italy. Among them are "Activol 30," "Frother 60," "Aerofloat 15," pine oil, "Armac T," and others.

YUGOSLAVIA—The *Gutehoffnungshutte* of Oberhausen-Sterkrade (Germany) will plan and erect a copper and brass works in Yugoslavia which will be the largest and most modern of its kind in Europe. Included in the works will be a foundry equipped with modern electric melting furnaces.

EIRE—Shortage of money and the fall in base metal prices is blamed by *Silvermines Lead and Zinc Company, Ltd.* for its decision not to proceed further with the Russell shaft which has been concreted to a depth of 95 feet. Negotiations are still going on with the D.F.M.A. and it is hoped that the company's application for a loan of £37,500 will be approved shortly.

A Cost-cutting team

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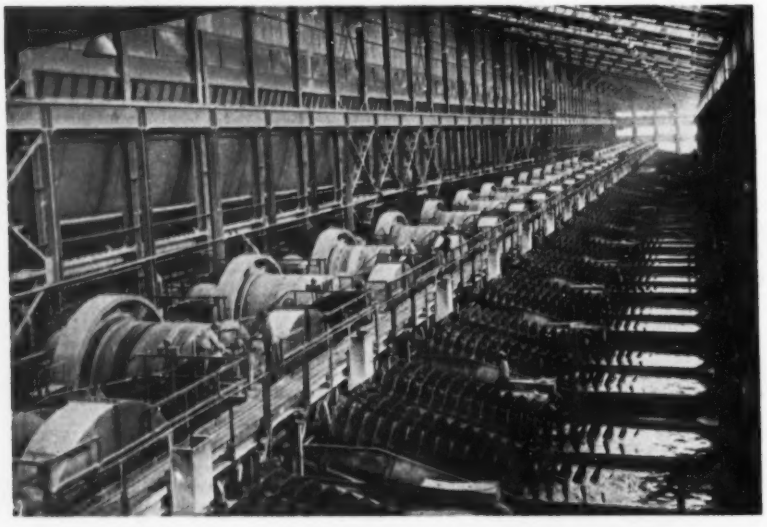

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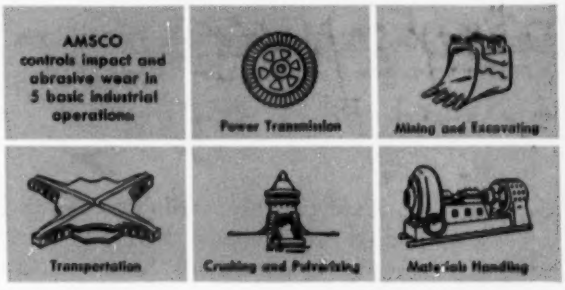

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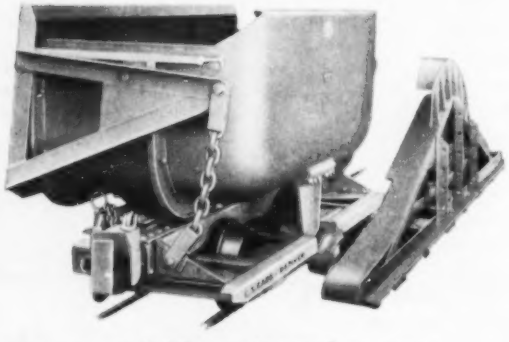

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SWEDEN—A large quartz deposit has been located at Prastchohesater, Rolanda parish, in southwestern Sweden. Quarrying will start as soon as possible.

WEST GERMANY—An ore deposit containing up to 66 percent uranium has been reported in the Black Forest by a German geologist. Further investigation will be necessary to determine whether mining operations would be practical. East German communists are said to be working mines which yield only 1.7 percent uranium ore.

EUROPE—American businessmen and firms planning to make new investments in 10 nations of Western Europe and Asia may now obtain a Mutual Security Agency guaranty protecting them against the risks of expropriation, as well as currency inconvertibility. The countries with which MSA has the necessary agreements are Austria, Belgium, China (Formosa), Denmark, France, the Federal Republic of Germany, Greece, Italy, Norway, and the Philippines. Convertibility guarantees are also available for new investments in The Netherlands, Turkey, and the United Kingdom.

NORWAY—*Undal* mine has been reopened after a shut-down of 30 years. The mine has now been dewatered and production will start as soon as the compressors are installed. The aerial tramway is now repaired, the new crushing machinery and the conveyors will be delivered shortly, and crushing operations will probably start in October. Production this year is expected to reach 5,000 tons and in 1953 20,000 tons. The ore is chalcopyrite, with about 10 percent copper and 40 percent sulphur. It will be exported through Trondheim harbor.

POLAND—It is reported that plans are under way for the erection of a huge iron and steel works near Cracow. A new city to house the workers will also be constructed, with both the plant and city to be named Nowa-Huta. An ore-treating mill, a sintering plant, a coke plant, blast furnaces, a power station, a series of rolling mills, and a number of repair workshops comprise the new works. Capacity is not revealed but it is estimated that it will be well in excess of 1,500,000 tons annually. The project is expected to be completed some time in the 1960's.

UNITED KINGDOM—There has been a temporary setback in barite mining. Stocks are high and many mines have not been able to dispose of their output. At the *Devonshire Baryta Company's* mine at Bridford, Devonshire, a number of men have been discharged and large stocks of barite are said to be awaiting shipment. In the north of England, *Silverband* mine has closed down, while at Cow Green 60 percent of the employes have been discharged. In Scotland, the tempo of barite mining has also slowed down, and in some of the fluorspar mines staffs have been reduced.

NORWAY—Extensions have been carried out at the *Falconbridge Nikkelverk* refining plant at Kristiansand, South Norway, which will enable the production of nickel to be increased to 14,000 tons a year. Norway's production of nickel last year was 11,080 tons. Nickel matte is imported from Falconbridge's smelter in Ontario, Canada.

WESTERN GERMANY—Uranium deposits have reportedly been found near Weissenstadt, and in the fluorspar mines of Woelsendorf and Nabburg. Some development work has been done at the Rudolfstein near Weissenstadt by *Maximilianshuette*, but no production has been reported so far.

SOUTH AFRICA—Exploration and drilling operations conducted by *Anglo-Rand Mining and Finance Corporation Ltd.* and *African American Gold and Mineral Exploration Ltd.* on a portion of the farm Vellefontein 1334, have resulted in the formation of the *Vellefontein Tin Mining Company Ltd.* Two-thirds of the share capital is owned by Anglo Rand and associated companies (including *Union Tin Mines Ltd.*) and the other third by African American. The new company has purchased the mineral rights over 1,313 morgen (about 2,772 acres) of the Vellefontein farm, which is situated in the Rooiberg area of the Transvaal. Mining operations have started, and in the initial stages ore will be treated in the plant of the Union Tin company. The capacity of Union Tin's plant was recently increased for this purpose. The area of the farm outside of the acquired mineral rights is held under option.

FRENCH EQUATORIAL AFRICA—By decree of the government of Dahomey, a mining permit granting exclusive development rights for its deposits of titanium has been given to the *Societe Miniere du Dahomey-Niger*, with headquarters at Zinder. The group is authorized to develop titanium deposits in northern Dahomey. The same group is already working a placer deposit on the Perma River, as well as in the Cercle de Natittingou, and tin and tungsten deposits in the Agades region of the Niger River.

SOUTH AFRICA—Formerly known as *New Reefs Gold Mining Company*, the *Zustershoek Tin Mining and Minerals Development Company, Ltd.* has now increased its capital to £100,000. Nearing completion is its treatment plant which will have an output capacity of 40 to 50 long tons of concentrates per month. The plant will be operated on a three-shift basis. An additional plant is already being ordered to increase capacity to about 100 tons within a year. Mining operations are in progress and a stockpile of hand-sorted ore is on hand which is expected to supply feed for nine months of milling.

GOLD COAST—*Bremang Gold Dredging Company* reports that for the period from January through May, 2,953,700 cubic yards were dredged, yielding 15,051 ounces of gold and an estimated operating profit of £68,900. These figures compare with 3,699,000 cubic yards, 16,775 ounces, and £90,564 profit for the corresponding period of last year. Most of the dredges have been working in the Offin and Jimi River areas. No. 2 dredge which was to be transferred to the Offin from the Ankobra River operation was delayed. However, investigation disclosed some payable values continuing in the area where it was already working so it was possible to keep the dredge in profitable operation for about nine months longer than originally planned. For the month of July, returns were as follows: No. 1 dredge treated 200,500 cubic yards and recovered 1,018 ounces of gold; No. 2 dredge, 66,900 cubic yards for 247 ounces; No. 3 dredge, 119,400 cubic yards for 780 ounces; No. 4 dredge, 199,000 cubic yards for 745 ounces.

NORTHERN RHODESIA—An area containing about 30,000,000 cubic feet of saw logs—enough to supply the copper mines with underground timbering for 15 years—has been located southwest of Chingola and west of Kitwe, according to the Northern Rhodesian Forestry Department. Arrangements are under way to begin cutting. Last year, 940,000 tons of wood were consumed and more than 29,000 acres were clear-felled. The copper mines have been cutting great quantities of wood fuel to supplement their insufficient supplies of coal. This was a temporary measure at first but now 80,000 acres of copperbelt woodland have been felled, and the forestry department is concerned about this continuing without any supervision. Reforestation and planting made some progress but did not catch up with the rate of cutting.

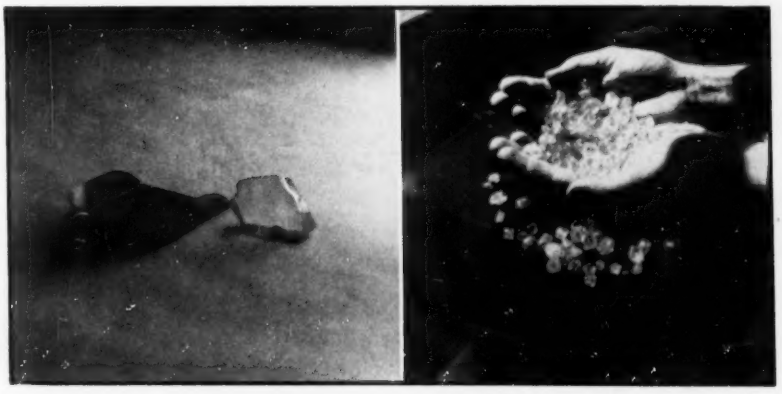
SOUTH AFRICA—The *Anglo American Corporation of South Africa, Ltd.* is reported to be taking a 75 percent interest in a monazite deposit in the Van Rhynsdorp district of Cape Province. The deposit has been drilled extensively. Planned annual production has been estimated at 8,000 tons of concentrate containing 55 percent of rare earths and thorium oxide. The right to mine and concentrate the ore and to export the products has been granted by the Minister of Mines on the recommendation of the Atomic Energy Board on the basis of an agreed royalty. All production for the period ending 31 March 1956 has reportedly been sold in advance, mainly to the United States. Discovery of the deposit is said to have started a rush to buy surrounding land. Some farmers are reported to be refusing to sell in the expectation of a higher price for their land.

FRENCH EQUATORIAL AFRICA—An interesting deposit of manganese has been located near Tiore. The manganese occurs in schists as pyrolusite (MnO_2). A minimum of 700,000 tons is said to be present with a grade of from 25 to 50 percent manganese. A group is being organized to develop the deposit.

NIGERIA—*Gold and Base Metal Mines* of Nyeba, Nigeria, reports that though tin production was slightly lower last year, this was offset by a higher production of columbite. Cost has risen seriously, to 33 percent over the previous year's total, chiefly through labor and royalty increases. The company is spending £50,000 to mechanize the mines as much as possible.

SOUTHERN RHODESIA—The long struggle over the control of *Tanganyika Concessions* is still unresolved. The various contesting share holders in Africa, Belgium, Great Britain, and the United States have agreed on a compromise and Sir Ulick Alexander has been elected chairman at the company's annual meeting in Salisbury. He succeeds Maurice Hely-Hutchinson who resigned last May. Sir Alexander will take up residence in Southern Rhodesia and will have to resign the chairmanships of the *Rhodesia-Katanga Company, Ltd.*, *Tanganyika Holdings, Ltd.*, and the *Zambesia Exploring Company*.

NORTHERN RHODESIA—Additions are being made to the plant of *Rhodesia Copper Refineries Ltd.* at Nkana which, when completed, will enable vertically cast shapes to be produced, probably during the first half of 1953. Extensions were made to the plant during the last fiscal year which brought the capacity up to 124,000 long tons annually. However, the continued shortage of coal rendered it impossible to obtain the power required for full production.



DIAMONDS GALORE FROM THE PREMIER

Diamonds of all sizes and shapes are produced at the Premier mine at Kimberley in the Union of South Africa. The largest diamond ever found there was the "Cullinan Diamond" which weighed 3,024.75 carats. The "Great Premier Mine Diamond," discovered in 1951 (shown above left), was 2½ by 1½ by ⅝ inches in size and weighed 283.5 carats. Its value was estimated at between $280,000 and $560,000. Believed to be only about one-half of a larger stone, it is hoped that the other part will be recovered eventually. The handful of diamonds (right) are valued at between $56,000 and $84,000, and also came from the mine, which is operated by the Permier Premier (Transvaal) Diamond Mining Company, Ltd. De Beers Consolidated Mines, Ltd. owns a controlling interest.

On Ozark-Mahoning Company Fluorspar Mining Operations

There's no waste of valuable fluorspar ore at the Roseclare concentrating plant of the Ozark-Mahoning Company. Scattered remains of ore stockpiles, that could not be picked up with the loading shovel, are salvaged by an HT4 TRAXCAVATOR Shovel-"Cat" D4 Tractor team.

Precision digging control enables the one-man salvage crew to skim off every bit of ore, cleanly and quickly. In addition, the HT4 lends a helping hand to the loading shovel, loading out trucks at a profit-making clip.

H. E. Bailie, General Superintendent of the Roseclare plant, reports, "Our HT4 is an excellent tool for general clean up at the stockpiles and as a standby shovel."

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INTERNATIONAL

ONTARIO—Iron ore output at *Steep Rock Iron Mines, Ltd.* for the first 15 days of September set new records. Total shipments from the *Errington* open pit reached 154,300 tons for the period, an average of 11,021 tons per working day. The number of railroad cars loaded reached 2,740, or an average of 196 each working day. Steep Rock ore has been moving down the Great Lakes at an average rate of better than one shipload each day. During the first half of the month, 22 ships were loaded at Port Arthur ore docks.

ALBERTA—In an all-out effort to have the new $17,500,000 nickel refinery of *Sherritt Gordon Mines, Ltd.* ready for operation in 1954, construction crews are working double shifts six days a week. The project is near Fort Saskatchewan, about 18 miles northwest of Edmonton. A railroad line will be built to the plant site to carry ore from the mines at Lynn Lake in northern Manitoba. *Chemical Construction Company* has the over-all contract to build the refinery.

GREENLAND—A new company, *Nordic Mining Company Ltd.*, reportedly has been formed to undertake lead mining at Mestersvig in East Greenland. It has an initial capital of 15,000,000 Danish kroner, 27½ percent of which is subscribed by the Danish government, 27½ percent by Danish companies, and the remainder by Swedish and Canadian interests. Further investigations are being undertaken before mining operations start.

BRITISH COLUMBIA—*Reeves MacDonald Mines Ltd.* is constructing an underground hoist room preparatory to sinking an inclined shaft along the footwall of the Reeves orebody. Sinking is scheduled to start soon. The firm reports a milling average of 27,500 tons of zinc-lead ore monthly so far this year. A new jaw crusher is expected to increase this output to about 30,000 tons per month.

ARIZONA—*Bagdad Copper Corporation* has undertaken an $18,000,000 expansion program in the Eureka mining district of Yavapai County to increase mining and milling activity over the next two years. Value of the metals extracted from the mines reportedly will increase from $6,200,000 during the past year, to $23,000,000 by 1954. Of this amount, $12,000,000 will be in copper, $1,000,000 in zinc, and $10,000,000 in tungsten ores.

ONTARIO—The Canadian National Railway is at work on a 600-foot extension to its iron ore loading dock at Port Arthur. The new addition will double the length and the capacity of the dock (now 30,000 tons) and is expected to be completed for the 1953 season.

SASKATCHEWAN—*Anglo Rouyn Mines Ltd.* reports gold and copper values in assay results as it continues its vigorous drilling program to explore the "A" zone of the Waden Lake property in northern Saskatchewan.

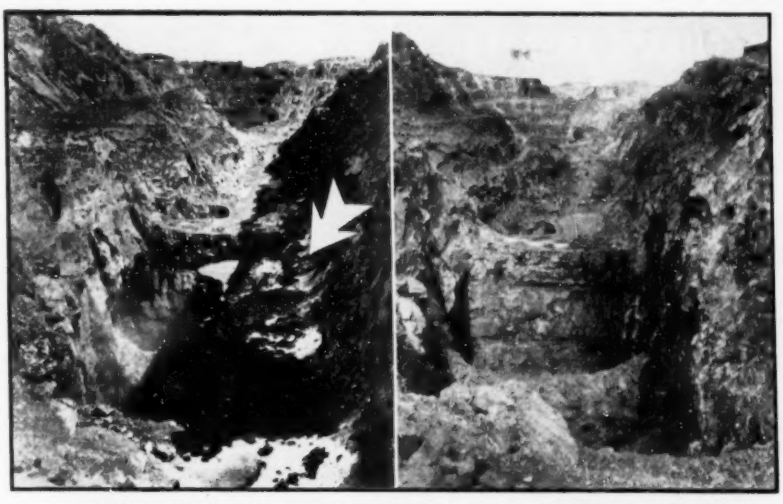
NORTHWEST TERRITORIES—*American Yellowknife Mines Ltd.* has started a second shaft sinking operation, this time at a subsidiary, *Snare River Mines*, where diamond drilling earlier indicated 50,000 tons of ore averaging 0.551 ounces of gold per ton to a depth of 275 feet. At the O'Connor Lake property, the shaft has now been collared and the headframe is being erected. The No. 1 vein is to be developed at the 150-foot level. Drilling results indicate the vein contains 250 tons of ore per vertical foot, averaging 18 percent combined lead and zinc. J. C. Byrne is president of American Yellowknife.

QUEBEC—*Eastern Metals Corporation Ltd.* reports rapid progress is being made at its nickel-copper property near St. Fabien de Panet. The mine shaft has been collared, and sunk 35 feet, and the headframe is now being erected. The combination mine dry, warehouse, and office is about two-thirds completed. The surface drilling has had to be stopped twice for cementing due to caving. The exploratory diamond drill, working about 2,400 feet from the shaft area, continues to cut copper values of high-grade ore over a narrow width ranging from 1.5 feet to 5.0 feet.

BRITISH COLUMBIA—*Violamac Mines Ltd.* plans to build a 150-ton mill for its lead-zinc-silver mine which would replace the present 30-ton mill now in use.

MICHIGAN—*Inland Steel Company* plans to give its 20,000 employes an opportunity to purchase company stock. Included in the group are employes from the *Greenwood* and *Morris* mines and the general office. Employes will be offered options on stock equal in value to 25 percent of their 1951 earnings from the company at $42.25 a share, which is 95 percent of the closing price for the stock on the New York Stock Exchange on August 25th. The options may be exercised at any time after one year and within three years.

ONTARIO—Production from the *Moulton Hill* and *Suffield* mines of *Ascot Metals Corporation*, before deductions, totaled $322,757 during August, when production included 190,542 pounds of copper, 302,268 pounds of lead, 1,226,926 pounds of zinc, 28,169 ounces of silver, and 321.6 ounces of gold. Lateral development on the 9th level of the Moulton Hill is continuing to open good ore with over 500 feet of length drifted out. On the 10th level (bottom), drifting has been temporarily halted in order to concentrate on mining on this horizon because during the next shaft sinking program all work on the level will have to be stopped until the shaft is completed. Raises currently being driven from the 10th to the 9th level are reported to be opening good widths with grade comparable to that exposed in drifting and mining on the 9th. On the new 3rd level of the Suffield, the crosscut is also making satisfactory progress. Original drilling indicated the drive would intersect ore about 600 feet from the shaft. Sampling of the last few faces, however, returned values close to ore grade, and the structural conditions indicate that the crosscut might hit ore at any time. From the 2nd level, flat drilling in the north drift is continuing to lengthen the ore to be anticipated between the 2nd and 3rd levels. Exploration on the 4th level will start soon.



INCO CONVERTS OPEN-PIT OPERATION

The "before and after" photographs shown above were taken from the south ramp of the Frood pit of The International Nickel Company of Canada, Ltd. in the Sudbury district of northern Ontario. A section of the footwall containing 225,000 tons of ore (marked by arrow in the lefthand picture) was blasted recently, leaving the gaping hole in the righthand picture. The ore dropped to the 600-foot level of the underground mine. Size of the area where the underground operations have holed through to the pit is 220 feet wide by 350 feet long. The operation was part of Inco's $150,000,000 program of conversion from combined surface and underground mining to all-underground mining. Without let-up in its present schedule, Inco has greatly enlarged its underground operations. Whole new areas have been developed for ore production, more than 70 miles of new underground openings have been driven in solid rock, four new concrete-lined shafts have been sunk, and much new equipment has been installed. Scheduled for completion next year, the company will then be able to hoist 13,000,000 tons of nickel-bearing ore per year.

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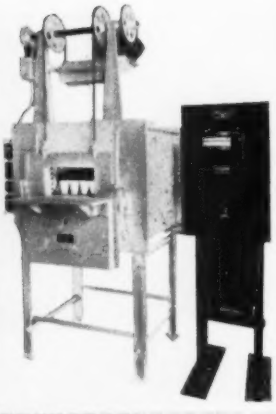

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ONTARIO—*Yukore Mines Limited* has acquired a one-third interest in 15 iron claims in Boston Township near Larder Lake, Ontario. A diamond drilling program has started after initial exploration. Camp buildings are being erected and two months' supplies have been hauled in.

NORTHWEST TERRITORIES—*Salmita Consolidated Mines Ltd.* is attempting to completely winterize its mining camp on the shores of Matthews Lake, 150 airline miles northeast of Yellowknife. Two, 250-hp., Paxman Diesel-electric units are being installed as a preliminary power plant, and the winterizing project is based on using part of this power for heat. In previous years, work has been suspended at Salmita during the winter.

SASKATCHEWAN—*Gunnar Gold Mines Ltd. and Associates* report that they have made a uranium discovery on the north shore of Lake Athabaska. The zone appears to be 450 to 500 feet wide, according to reports, and the area of radioactivity extends for a length of over 1,000 feet. The deposit is said to be something new in Canadian uranium mining experience in that it is massive in character and appears to be of a limestone or marble appearance. No blasting will be attempted until a scintillometer survey is made as a guide to further work.

ONTARIO—Although *Buffalo Ankerite Gold Mines* is currently treating in excess of 300 tons of ore daily at its *Porcupine* mine, President F. R. Burton reports that unless substantial higher grade ore bodies are discovered in the near future the mine will be placed on a salvage basis. This would mean that only such ore as will definitely show a profit will be extracted and milled. An extensive exploration and development program, incorporating all of the ideas of the company's staff and of a firm of independent engineers, has located only a few small ore bodies of insufficient tonnage. Operations in the past few months have been at a loss.

NORTHWEST TERRITORIES—*Indore Gold Mines Ltd.* has decided to enlarge its milling plant from 20 tons to 50 tons per day as the result of a discovery of two more radioactive zones on its property holdings in the Hottah Lake area. Indore's resident engineer Frank W. Anderson reports that one of the new zones will more than double the "Pitch 8" ore reserves already valued at $4,350,000. The other major discovery of radioactive material is located at Indore's "Pitch 27-28" property.

MICHIGAN—Work on the *White Pine* copper mine project is proceeding rapidly. Headway is being made at the mine site, town site, and residential sections. Most of the 100 acres needed have been cleared and leveled. Work has started on the 14-mile railway extension from Bergland, and on various buildings and plants. Concrete pouring for the 35-foot portal tunnel has also begun. A daily ore production of 10,500 tons is planned when the project is completed.

NORTHWEST TERRITORIES—The first two holes completed below the 5th level at *Tungsten Corporation of Canada Ltd.'s Outpost Island* property intersected gold values, officials report. Hole No. 1 is said to have returned 0.46 ounces, and 0.62 percent copper across 4.0 feet, and hole No. 2 cut 4.38 ounces of gold over 5.5 feet. Assays are awaited on five additional holes. Work is also scheduled to begin on the optioned *Otto* group in the Yellowknife district.

BRITISH COLUMBIA—Exploration and development have started on a new

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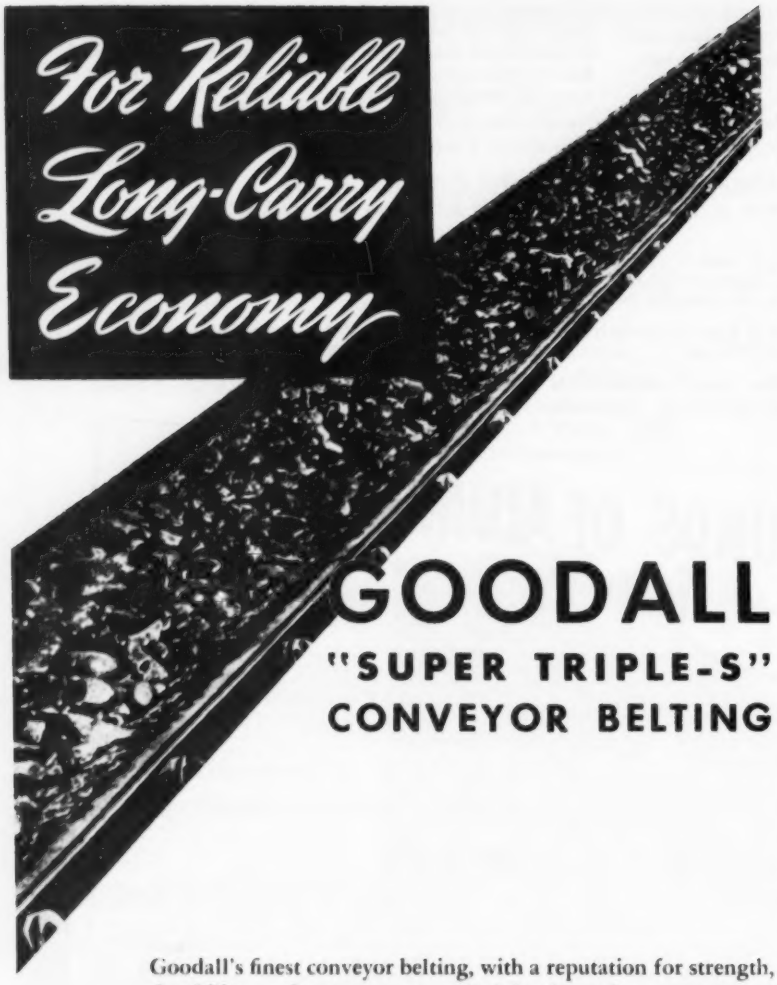

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property acquired by *Sheep Creek Gold Mines, Ltd.* in the Lardeau mining district, about 40 miles north of the head of Kootenay Lake. The property includes 78 claims and represents a consolidation of the *Wargner Jewell, Abbott,* and *Bannockburn* groups. It is now known as the *Wagner* property. A mining camp is being constructed and preparations for surface trenching are in progress. Former operators drove a 140-foot tunnel on the vein and sank a 60-foot winze, exposing lead-silver-zinc ore. A new tunnel will be driven under the structure for at least 2,000 feet.

ALASKA—The *Ebner Gold Mining Company* has reportedly sold its entire stock to the *Alaska Juneau Gold Mining Company.* Nineteen patented lode claims and 216 acres, but no developed ore reserves, are said to have been involved in the transaction. Acquisition of the property is expected to eliminate any possible disputes over apex rights in the future, when Alaska Juneau resumes mining on the lower levels. It has been closed since 1944.

WASHINGTON, D. C.—Dependence upon foreign kyanite for the United States defense program is being rapidly removed through the increased production of synthetic kyanite. The kyanite and mullite industry in the United States is now producing approximately 46,000 short tons a year, with synthetic kyanite accounting for about 18,000 tons. This represents an increase of about 16,000 tons over the synthetic kyanite produced at the start of the defense mobilization program. This synthetic production, plus about 20,000 tons of domestic kyanite mined annually, should soon equal total demand for kyanite and mullite by American industry.

MANITOBA—*American Smelting and Refining Company* is diamond drilling in the Lynn Lake area north of *Sherritt Gordon* property. The firm is exploring the *Goodenough* property originally drilled several years ago. At that time, all 12 holes drilled cut pyrrhotite, magnetite, and some chalcopyrite. There are about 50 claims reportedly in the group, including a part of Barbara Lake.

ONTARIO—*Steep Rock Iron Mines, Ltd.* is pushing seven headings on a three-shift-per-day basis in its initial underground program at the *Errington* mine. The new Errington underground plant is highly streamlined and total investment involved was about $5,000,000. Increased mechanization and use of block caving are expected to reduce mining costs. The initial shaft is designed for a production of 5,000 tons of ore daily.

SASKATCHEWAN—Intensive exploration is under way to determine the potential of the properties held by *Goldfields Uranium Mines Limited* at Lake Athabaska. Drills are active on four claim groups; in other sections of the property, crews are at work taking magnetometer readings and preparing for further assessment work where radioactive showings have been indicated in previous surveys.

ONTARIO—*Canadian-Cliffs, Ltd.*, the wholly owned subsidiary of *Cleveland-Cliffs Iron Company*, is actively engaged in exploration and examination of iron ore prospects on both private and crown lands in New Brunswick, Quebec, and Northwestern Ontario.

BRITISH COLUMBIA—A $3,000,000 development program will be undertaken by *American Metal Company, Ltd.* of New York on the *Salmo Prince* silver-lead-zinc property, owned by *Salmo Prince Mines, Ltd. Amco Exploration*

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Ltd., a wholly owned subsidiary of American Metal, will be in charge of the work. Salmo Prince will retain a substantial interest in earnings on a royalty basis. It will also continue as an active company in the exploration and development field. Recent reports of tungsten showings in the South Okanagan district will be explored by Salmo Prince. These tungsten claims, nine miles west of Oliver, were originally staked as a gold prospect.

NORTHWEST TERRITORIES—Shaft sinking is expected to be resumed at the property of *Bulldog Yellowknife Gold Mines* at Matthew Lake about 150 miles northeast of Yellowknife. The company has been working on installation of a power plant, compressor and hoist. The three-compartment shaft has been completed to a 38-foot depth. It will open two levels, one at 200 feet and the other at 400 feet.

NEWFOUNDLAND—*Independent Mining Corporation* is proceeding with an underground development program at its *York Harbor* base metal property after favorable results from recent diamond drilling. The old mine workings, located on the side of a hill, will be extended southward by a long adit which will be driven at least 2,000 feet making two ore lenses accessible for mining. A contract has been let for this work. Mining plant and equipment have been ordered, with the expectation that driving may be finished by February. The provincial government has agreed to proceed with construction of a 14-mile road to the mine from Benoits Cove, with the understanding that the company will repay a portion of the cost if profitable production is achieved. Informal discussions have been held with officials of the *Newfoundland Power and Light Company* to deliver 3,000 hp. to the mine.

YUKON TERRITORY—*American Metal Company, Ltd.*, through its wholly owned subsidiary, *Amco Exploration, Ltd.*, has reportedly signed an agreement with *Mount Keno Mines, Ltd.*, to provide $200,000 and up to $3,000,000 for development of high-grade silver lead property on the south slope of Keno Hill.

ONTARIO—One of the largest nickel-copper ore bodies in recent Canadian mine development has reportedly been established by *Falconbridge Nickel Mines, Ltd.* in one small sector of the Sudbury Basin's north rim. The major extension of indicated ore reserves has been achieved in the Fecunis Lake drilling midway along the "Levack belt."

BRITISH COLUMBIA—*Canadian Exploration Ltd.* reports that its Jersey lead-zinc mill handled 155,274 short tons of ore and produced 18,948 tons of concentrates in the six-month period ending June 30. Net profit for the period is estimated at $1,940,000. Capacity of the mill is to be increased to 35,000 tons monthly by the end of the year.

BRITISH COLUMBIA—The *United States Smelting, Refining and Mining Company* of Boston, Massachusetts, has been registered in British Columbia recently to carry on exploration and development of natural resources.

LATIN AMERICA

MEXICO—General A. Morales Salas and Joseph Wekstein have been awarded the concession to develop rich sulphur deposits on the uninhabitated island of Socorro, 369 miles off the coast of northwest Mexico. Various surveys have estimated the deposits at 800,000 tons or more with an average purity of 95 percent. Several United States mining companies have attempted to get the concession. The Mexican group reportedly plan to spend $827,000 on the operation. They will build a refinery on the island and hope to produce 200 tons of refined sulphur daily within nine months to a year.

CUBA—The *Nicaro* nickel plant in Oriente Province is now in full operation. Recent production figures reportedly indicate that the plant has met the goal of higher efficiency by producing nickel in greater quantities than it did during its wartime operations. Nicaro was built by the United States government at a cost of $32,000,000. It produced 63,500,000 pounds of nickel before its shutdown in 1947. Rehabilitation, begun in 1951, cost about $12,000,000. The projected goal is 3,000,000 pounds of nickel annually.

BOLIVIA—It is reported that a group of Argentinians headed by Selim Chacur have made an agreement with the Bolivian government to erect a tin smelter and other industrial plants in Bolivia. Bolivia reportedly will supply 51 percent of the authorized capital ($220,000,000), while the Argentine group will supply 49 percent. Among other things, the agreement is said to grant a 25-year monopoly on tin smelting. The government is particularly interested in becoming independent of the various tin smelters in other parts of the world which might refuse to buy Bolivian tin ores or might raise the penalties for impurities if nationalization of the mines goes through without adequate compensation.

MEXICO—*Minas de Guatano, S. A.* is installing a new 36-inch Wemco classifier in its zinc-lead mill in Sonora.

CUBA—The Director of Mines of the Agriculture Department inspected the *Florencia* copper and gold mine in the Guaimaro district of Camaguey and indicated that the mine had good showings. The ore reportedly has yielded half an ounce of gold to the ton.

BRITISH GUIANA—The manganese deposits of *Barima Gold Mining Company (Canada) Ltd.* are being explored by a mining company from the United States which is said to be interested in the property. This company (name not revealed) has been granted a two-year option, and promises to spend $100,000 on exploration.

MEXICO—The Republic Steel Company (a U.S. firm) is reportedly planning to invest 80,000,000 pesos ($9,250,000) in the development of iron deposits at Tapatila near Jalapa, Vera Cruz. The work is scheduled to start this fall, according to Marco Antonio Munoz, governor of Vera Cruz. Special facilities have been granted to Republic by the Vera Cruz and Federal governments for the operation.

BOLIVIA—*Cia. American Smelting Boliviana Ltd.* announced some time ago that it was closing its *Corocoro* copper mine. Now the company is being accused of sabotage because it is withdrawing its trucks and materials.

JAMAICA—A geological survey is being made of an iron ore deposit on the island which is reported to occur in sufficient quantities to make shipments to Canada and the United States a practical possibility.

BRITISH GUIANA—*African Manganese Company Ltd.* is conducting an independent survey for manganese. First area to receive attention is at Arakaka in the northwest district. African Manganese has extensive manganese holdings in West Africa.

MEXICO—*Fundidora de Fierro y Acero de Monterey, S.A.*, Mexico's largest iron and steel works, has notified the Federal Board of Conciliation and Arbitration that it will close its *Golondrinas* iron mine in northern Nuevo Leon because of exhaustion of ore after 50 years of operation. The 200 miners will be fully compensated in cash as provided by law. Fundidora has arranged to work iron deposits in other parts of Mexico.

MEXICO—*Compania Minera Santa Maria del Oro, S.A.*, wholly owned subsidiary of the *International Mining Corporation*, reports that for the six months ended June 30, 1952, the company milled approximately 84,050 dry metric tons of ore of an average grade of 11.37 grams of gold and 0.972 percent of copper. After provision for depreciation, depletion, amortization, and income taxes, the company showed a loss of $5,168.89 for the six months. A substantial part of

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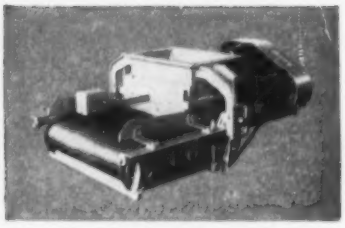

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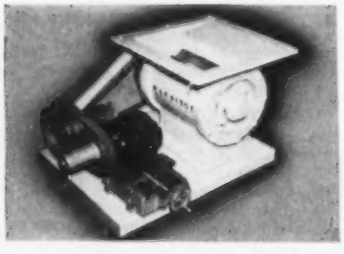

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the mine operation expenses represented development expenditure which may be capitalized later in the year if development work adds materially to the ore reserves.

NICARAGUA—*La Luz Mines, Ltd.* reports a sharp increase in profits for the nine months ended June 30, 1952. Operating profits totaled $546,667 compared with $275,027 for the same period in 1951. Principal reason for the increase was the larger tonnage milled—518,589 tons against 459,994 tons in the previous year. Gold output rose 14,106 ounces to 56,555 ounces. Deepening of the main shaft started in the June quarter and sinking of 80 feet had been accomplished by the end of June. During that period, the height of the Mistrook water storage dam was increased an additional five feet making a total height of 65 feet. This adds to the company storage facilities considerably.

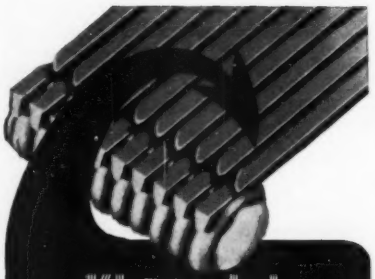
CUBA—Large deposits of iron pyrite are reported to be present in the *Margot* mine near Corral Nuevo, province of Matanzas. The Commission on Mine Investigations of the Ministry of Agriculture will inspect the property. It is also reported that a uranium mine has been located in the district of Sr. Maria Ana Salas de Garcia.

BRAZIL—Two hydroelectric projects have been set up in the state of Minas Gerais under a modernized power development program expected to stimulate mining and manufacturing in the state. *Companhia de Electricidade do Alto Rio Grande* and *Companhia de Electricidade do Alto Rio Doce* will operate the Itutinga and Tronqueiras projects which will eventually be interconnected in a regional power system. *Westinghouse Electric International Company* is supplying the power generating apparatus. The first Itutinga generator is scheduled for shipment in the spring of 1954, and the second a year later. Shipments on the Tronqueiras project are expected to be completed by the fall of 1953.

CHILE—A special subcommittee has been appointed by the Legislative and Judicial Committee of the Chamber of Deputies to make a study of the proposal to nationalize all areas containing deposits of radioactive minerals.

MEXICO—*Banco de Comercio, S.A.*, surveying the industry, reported that mining production, particularly that of gold, copper, and lead, had dropped sharply because of high production costs, transportation, and an irregular market. The review covered the first quarter of 1952 and noted an improvement during that period for zinc and silver, although silver was still substantially low compared with production in the years immediately following World War II. During the first quarter of 1952, gold output averaged 31,524 ounces per month, compared with 32,181 ounces in 1951; and lead averaged 18,529 tons, compared with 21,798 tons. Copper averaged 3,244 tons in the first quarter but 5,361 tons in 1951.

BOLIVIA—The Council of Ministers at La Paz is reported to be considering construction of a tin smelter there. Construction of roasting and leaching plants is said to have been discussed with the United States Reconstruction Finance Corporation in the past, and bids are reported to have been received from Uruguayan, Argentine, and European contractors. The Bolivian government is said to be studying these bids but they do not extend to the construction of a tin smelter.



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Whatever your mining job, there's a General Motors Diesel to supply the power. For General Motors Diesel engines now power more than 260 different models of mining equipment built by over 50 manufacturers.

Widespread demand for the 2-cycle GM Diesel engine results from its ability to get more work done faster and at lower cost. GM Diesel's fast acceleration boosts production. Smooth 2-cycle operation reduces wear and extends engine life. Consistent operation of accessories simplifies maintenance. What's more, GM Diesels definitely cost less to maintain and repair because parts cost less, are highly interchangeable and are available everywhere. See your GM Diesel distributor or write us for full information.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS · DETROIT 28, MICHIGAN

SINGLE ENGINES 32 to 378 H.P. · MULTIPLE UNITS . . . to as much as 840 H.P.

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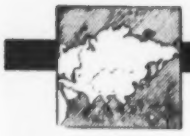
Write for booklet, "A 50,000,000 Horsepower Insurance Policy" that tells the story.

GM
GENERAL MOTORS
DIESEL POWER



INDIA—*Chowgule & Company, Ltd.* expects to begin shipments from its newly mechanized iron ore mines at Goa early in 1953. Most of the machinery from Japan has arrived and is being installed. Recently an agreement was concluded with a Japanese firm, with a view toward mechanizing the mines and obtaining an annual production of 500,000 tons of high-grade iron ore to be shipped to Japan. The eventual target will be 1,000,000 tons within a period of two years.

TURKEY—The *Karabuk Iron and Steel Works* is now said to be in a position to supply more than half of Turkey's annual requirements for iron and steel. The plant is now capable of producing annually 293,000 tons of coke, 115,000 tons of pig iron, 103,000 tons of steel, 72,000 tons of various iron products, 11,000 tons of cast iron pipes, 2,762 tons of ammonium sulphate, 16,000 tons of tar and pitch, 4,000 tons of benzol, and 345 tons of napthaline.

KOREA—Among the industrial targets bombed by United Nations warplanes in North Korea recently was a mining and ore processing plant at Sinhung, 60 miles south of the Manchurian border on the Yalu River. Damage was reported as 35 buildings destroyed and 33 damaged in the big plant.

INDIA—The price of quicksilver has risen sharply since the rumor that the Indian government might shortly permit the re-export of the metal. Large quantities were bought at the outbreak of the Korean War at prices ranging from £23 to £28 per flask. India's annual requirements are around 5,000 flasks, and the country is reported to have about 23,000 flasks on hand. Should re-export be permitted, traders believe the local price might reach 450 rupees, but this would still be well below the present U.S. price of $187 per flask, or the United Kingdow price of £64 per flask.

JAPAN—The government reportedly will permit *Aluminum Ltd.* of Canada to buy into the *Japan Light Metals Company*, subject to adjustment on minor points. The project has been held up for several months because of the fear that Canadian interests might control the Japanese aluminum company. The Canadian firm is said to have proposed to invest 744,000,000 yen ($2,060,000) to acquire 12,400,000 shares of stock at 60 yen per share. The company also was reportedly willing to loan 645,000,000 yen at 5.5 percent interest a year for eight years, and to supply technical help and shipments of bauxite.

TURKEY—Prospecting for chrome deposits is becoming increasingly extensive in certain areas of Turkey. The Turkish Trade Minister reports that the number of mining applications received rose from 4,280 in 1950 to 6,790 in 1951, and to more than 8,290 during the first six months of 1952.

THAILAND—The Ministry of Finance has announced that as of September 15, only 20 percent of foreign exchange derived from tin ore exports must be surrendered to the government at the official exchange rate. Previously, 40 percent had to be surrendered.

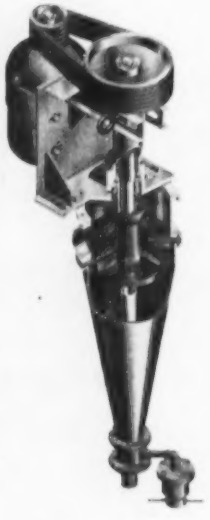
ISRAEL—A rich iron ore deposit has reportedly been found in the vicinity of Negev.

JAPAN—Five leading steel manufacturers—the *Yawatam, Fujim, Kawasaki, Nichia,* and *Yodogawa* companies—reportedly plan to buy $20,000,000 worth of steelmaking equipment from the United States. Authorization for the purchases is said to have been received from the U.S. and the action presumably will help cut the production costs of Japanese steel.

INDIA—India's best customer for mica, the United States, is cutting its imports of mica heavily. The result reportedly has caused near panic in the mica trade in Rajasthan and Bihar. United States imports decreased from 261,427 cwt. in 1950-51, to 177,099 cwt. in 1951-52. A progressive decline in the demand for mica splittings—seven-tenths of the mica trade—has caused many small

CLASSIFICATION WITHOUT DILUTION

Producing a –65 mesh grind at 65% solids



And a —100 mesh classifier overflow can frequently be produced at 60% solids. Centriclone classification is a new technique that maintains high density in the classifier overflow. It is utilized in fine grinding where open circuit tube mills are being used.

COMPARATIVE DATA

In this limestone grinding operation, each 7' x 26' Allis Chalmers Mill is in closed circuit with a Model C-20 Centriclone. They were previously in normal open circuit.

	Open Circuit	Closed circuit with Centriclone
Production, tons per hour	21.4	31.5
Percent solids in product	63.0	64.5
Percent —200 mesh	88.0	88.0
Largest particles in product	*20 mesh	65 mesh
Total kwh. per ton	20.5	14.5

*After screening at 14 mesh.

In this typical installation, the Centriclone Classifier achieved these advantages: (1) Increased grinding capacity at small additional capital investment; (2) Reduced power and grinding media consumption per ton; (3) Elimination of tramp oversize; and (4) Production of a high density, classified grind.

EQUIPMENT ENGINEERS, INC.

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For Splitting Feed Into Equal Parts

The Concenco Revolving Feed Distributor automatically splits feed into a number of equal parts from 2 to 10. It distributes liquids or mixtures of solids and liquids with an accuracy assuring increased efficiency of the circuits served. It is ideal for feeding a battery of concentrating tables requiring an equal distribution of feed to each table. Send for complete information.

Made by
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Incorporated 1906

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factories to close down and the larger ones to reduce output. The trades and mining associations have drawn the government's attention to the situation and have recommended that the industry look for new markets and stop the export of mica scrap which is reducing the demand for virgin mica.

TURKEY—Rich workable veins with a tungsten content of about two percent are reported to have been shown in preliminary prospecting work on a deposit near Broussa. A group has been formed to supply the necessary equipment for developing the deposit next spring.

INDIA—With the help of *Messrs. Pilkington Brothers, Ltd.*, a company has been formed to work the Assam sillimanite deposits. Despite the intense difficulties caused by the nature of the jungle and the heavy rainfall which impede production and transportation, the company has established a group of industries near Nongmaweit in the Khasi Hills. Here, they quarry the sillimanite boulders; part-saw the large ones for final sawing elsewhere; and crush the smaller ones for resale to refractory manufacturers. A 22-mile road has been built to connect the quarry with a local road to Hahim, and a substantial fleet of motor vehicles has been provided. Electric power generators, water supply, and repair workships have been installed at the quarry, while in Calcutta precision machines have been installed to cut the partly-sawed boulders into furnace blocks. This is the first time that a substantial industry is now functioning from these deposits. Full-scale extraction of sillimanite at the mine began in October and November 1951. Production to March 1952 was 4,174 tons. The present goal is 5,000 tons per annum.

MALAYA—*Ampat Tin Dredging Ltd.* is reported to be financing from its own funds the transfer of Tujoh dredge to the new area on the Kent estate. It is hoped that the erection of the dredge will be finished by the end of this year, although there will be a further period of three months before the dredge reaches the production stage.

JAPAN—A new method of reducing the iron, nickel, and copper contained in sinter which remains after recovering sulphur from pyrrhotite has been perfected by Professor Nishihara of Kyoto University and the metallurgists of the *Fujikoshi Mining Company*. It will be applied on a commercial scale for the treatment of pyrrhotite from the company's *Okura* mine in Niigata prefecture. The pyrrhotite is roasted, and the sulphur dioxide gas is used to make sulphuric acid. The sinter is given a chloridizing roast in a rotary kiln. The water soluble nickel and copper chlorides are leached from the high-grade iron oxide, and, by electrolysis, nickel and copper are recovered. A new roasting furnace will have a capacity for treating 50 tons of ore; the reduction equipment will produce 40 tons of iron oxide, 500 kilograms of copper, and 300 kilograms of nickel from the sinter. The Suruga plant will be located in Fukui prefecture.

THE MARKET PLACE

MOTORS—M. G. SETS—TRANSFORMERS

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

MOTOR GENERATOR SETS

QU.	KW	MAKE	RPM	VOLTS DC	VOLTS AC
1 (3-U)	2400	Whse.	720	600	2400/4800
3	1000	Whse.	514	600	11000/6600
4	1000	G.E.	514	600	11000/6600
1	1000	G.E.	514	600	2300
1	500	C.W.	720	275	2300/440
1 (3-U)	500	Whse.	1200	250	440
2	500	C.W.	720	575	2300/440
2	250	Whse.	1200	125/250	2300
1	200	Ridgway	900	275	2300
1	155	G.E.	720	250	2300/440
2	150	Whse.	1200	250	2300
1	100	Al.Ch.	1200	125/250	4000/2300
1	100	Delco	1200	125/250	440/220
1	100	Ridgway	1200	275	4000/2300
1	100	C.W.	1200	125	440/220
1	85	C.W.	1200	250	440/220
1	75	Al.Ch.	900	250	2300
1	75	Whse.	900	75	2300
1	50	Burke	1750	250	440/220
1	25	Ideal	1750	125	220
1	25	Al.Ch.	1200	250	440/220
1	20	Al.Ch.	1200	250	440/220
3	15	Al.Ch.	1200	250	440/220

We can furnish any of these sets with exciters and VARIABLE VOLTAGE CONTROL engineered and rebuilt to your requirements.

Motor Generators of modern design, complete with control—still on their original foundations—available for immediate shipment.

(3)—G.E. 1500-KW, 250-VDC, 514 R.P.M., c-d., interpole, pole face windings. 2100-HP syn. motors, .8-PF., 13,200-V., 3-p., 60-cy. will reconnect to 6600 V. or 4160-V.

SLIP RING MOTORS—CONSTANT DUTY
3-Phase—60 Cycle

QU.	HP	MAKE	TYPE	VOLTS	R.P.M.
1**	1800	G.E.	MT-498	2300	257
1**	1200	G.E.	MT-26	2200	277
2**	1000	Al.Ch.	ANY	2200	255
1	800	G.E.	MT	2200	440
1**	600	G.E.	MT-20	2200	360
2	500	G.E.	1-16-M	2300	450
1**	400	Al.Ch.	ANY	2200	514
2	400	G.E.	MT-412	2200	450
1	250	Whse.	CW-937	440	1200
1	250	Al.Ch.	ANY	440	720
1	250	G.E.	MT-414	2200	360
1	200	G.E.	1-16-M	2200	600
1	150	G.E.	1-13-M	2200	1750
1	125	Whse.	CW-870	2200	900
1	100	Whse.	CW-766	440	1200
1	100	F.M.	H-20-C	440	900
2	100	G.E.	1-15-M	2300	514
1	75	Whse.	CW-7540	440	720
1	60	Whse.	CW	440	900
1	50	G.E.	MT-536	2200	1200
2	50	Al.Ch.	ARY	440	900
1	50	F.M.	SR	440	600
1	40	Al.Ch.	ARY	440	900

From our stock we can furnish manual and magnetic primary and secondary controls up to 3500 HP.

SYNCHRONOUS MOTORS
3-Phase—60 Cycle

QU.	HP	MAKE	P.F.	VOLTS	R.P.M.
1	6000	G.E.	100	2300	90
1	4250	C.W.	100	13,200/6600	514
1	3000	Whse.	80	4800/2400	720
2	2100	G.E.	100	2300	360
2	1750	G.E.	100	2300	3600
1	1000	El. Mchy.	100	440	1200
1	750	G.E.	80	2300	450
1	700	G.E.	80	2300	720
1	250	G.E.	100	2300	514
1	250	El. Mchy.	80	440	400
2	200	Whse.	80	440	1200
1	190	G.E.	80	440	720
1	150	G.E.	100	2200	900
1	150	G.E.	100	550	600
1	150	G.E.	80	550	450
3	135	G.E.	80	4000/2200	1200
3	125	El. Mchy.	100	4800/2400	900
1	125	G.E.	80	2200	900
2	100	Whse.	80	440	1800
1	100	Ideal	80	440	900
2	100	G.E.	80	440	600
1	60	G.E.	80	440	1200
2	50	G.E.	80	240	600

With these we can supply—manual, semi or full magnetic, full or reduced voltage control.

METAL CLAD SWITCHGEAR

(2)—G.E. draw-out O.C.B.'s—600 amps., 15,000-V., type FKR-255-B, 250,000-KV interrupting capacity.

(1)—G.E. draw-out O.C.B. 600 amps., 15,000-V. type FK-46, 100,000-KV, interrupting capacity.

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FUMEALL a combination of virgin wool and Dynel, combines the undisputedly superior filtering qualities of wool with the strength, heat, acid, alkali and moisture-resistance of synthetic fibers.

FUMEALL is available in the exact porosity and weave which meet your specific requirements.... **FUMEALL** can be ordered as yardage or can be fabricated into bags of any size and specification.

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puts an end to the old swing frictions

We'll make this promise: You'll never have to "baby" this machine, even in the heaviest going! It's *built* for it — all-welded of alloy steels throughout, the toughest construction known. *It means steady digging.*

But the big pay-off in extra production comes with Magnetorque electric swing — enough faster to deliver 5 cycles to 4 on other machines in the 2½ yd. class. And the "time-outs" for adjustment and replacement of swing friction linings can now be salvaged for increased yardage. Magnetorque lasts the life of the machine.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

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Ask today for facts about the 955-A. Also the Model 1055 — its companion machine with 3½ yd. capacity.

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U.S. METAL & MINERAL MARKETS

METALS

OCTOBER 17, 1952

COPPER:	Electrolytic. Delivered F.o.b. cars, destination U.S.A.	24.50¢
	Lake. Delivered, destinations U.S.A.	24.625¢-27.50¢
	Foreign Copper. New York	36.00-36.50¢
LEAD:	Common Grade. New York	14.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$176.00
ZINC:	Prime Western. East St. Louis	13.50¢
	Tri-State Concentrate, 60% zinc, per ton	$92.50
ALUMINUM:	Primary 30 pound Ingots (99% plus). F.o.b. shipping points	20.00¢
ANTIMONY:	Lone Star Brand. F.o.b. Laredo, in bulk	39.50¢
BISMUTH:	(In ton lots) price per pound	$2.25
CADMIUM:	Sticks and bars. 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	97-99%, keg of 550 pounds (Price per pound)	$2.40
MAGNESIUM:	Ingots (99.8%). F.o.b. Freeport, Texas	24.50¢
MERCURY:	Flasks. Large lots, New York	$187.00-$193.00
NICKEL:	"F" Ingots (5 pounds). F.o.b. refinery, Port Colburne, Ontario	56.50¢
TIN:	Grade A Brands. New York (Price per pound)	121.50¢
TITANIUM:	99.3% + (Price per pound)	$5.00-7.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	Newly mined domestic. United States Treasury price	90½¢ per ounce
	Foreign. Handy & Harman	83.25¢ per ounce
PLATINUM:		$93.00 per ounce

ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO. F.o.b. mine, Colorado	$36.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; and 10.0% and over, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3	$45.00-$48.00
	African (Transvaal). 48% Cr_2O_3.	$34.00-$35.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$53.00-$54.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe	$ 9.05
	Mesabi, Bessemer, 51.5% Fe	$ 9.20
	Old Range, Non Bessemer	$ 9.30
	Old Range, Bessemer	$ 9.45
MANGANESE ORE:	Metallurgical grade. 46 to 48% Mn. Long ton unit	$1.15-$1.23
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Chemical grade, domestic, 70% MnO_2, F.o.b. mines	$45.00
	U. S. Government ore purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; base price of $6.05 per long dry ton of 12% manganese ore. Phillipsburg, Montana; base price of $6.43 per long dry ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2. F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	60% WO_3. Per short ton unit	$65.00
URANIUM ORE:	Carnotite-Roscoelite. F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	Carnotite-Roscoelite. V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock. . . . Per Pound V_2O_5	$0.31

NON-METALLIC MINERALS

BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	Metallurgical grade. 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$42.00-$43.00
	Acid grade. 97% CaF_2	$60.00
PERLITE:	Crude: F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants per short ton	$7.00 to $9.00
	Concrete grades. Crushed and sized	$6.00 to $8.00
SULPHUR:	Long ton, F.o.b. Gulf Coast mines	$22.00

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N. Y.

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PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Dart Truck Features Three Stage Torque Converter

This new extra-heavy-duty Dart truck is complete with Dart's heavy-duty, planetary-type rear axle, a 350-hp. Die-

sel engine, and a three-stage hydraulic torque converter with down-hill braking. Circle PEP No. 71 for complete load and performance specifications.

Thomas Flexible Coupling: No Lubrication, Backlash

The Thomas Flexible Coupling Company is announcing the distribution of its latest engineering catalog No. 51 describing its full line of all metal flexible couplings for power transmission.

This new catalog in a 9- by 11-inch leather binder provides much engineering data. Couplings are grouped and indexed to facilitate quick reference. Keyway data, standards for straight and tapered bores, as well as ordering instructions, are included for each group. Standard couplings are shown in individual sections of the catalog, and are followed by a special section showing many couplings designed for specific purposes with photos of typical installations.

A wide range of horsepower and speeds are covered, from small motor couplings to large industrial applications and main drives on Diesel locomotives and ships.

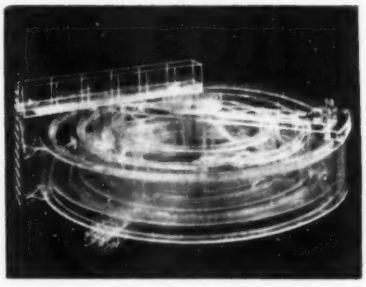
The Thomas principle embodies: no lubrication, no backlash, no maintenance, with adequate capacity for misalignment as well as free end float under load. All parts remain in balance, even under parallel and angular misalignments and all load conditions. There are no wearing parts in Thomas couplings.

If you have a power transmission problem, circle No. 83 for this free catalog.

NewConcen-TankThickener Designed For Many Uses

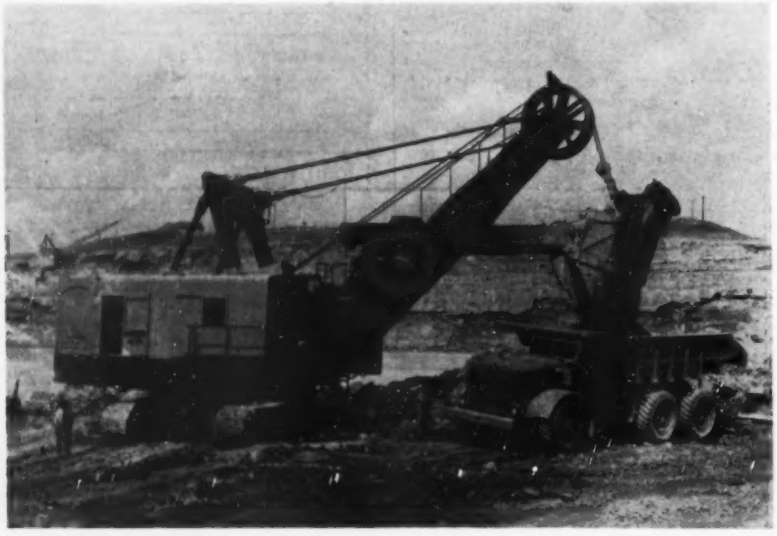
The new Morse Concen-Tank (Concentric Tank) thickeners offer many advantages over other conventional thickeners for metallurgical, chemical, cyanide, coal, and sewage disposal plants. They are especially desirable for series thickening and washing, countercurrent systems, and multiple-stage washing. They are flexible to meet a wide range of conditions and operating requirements.

Visibility is always clear and tank operation can be observed at all times. They do not require excessive headroom,



consume less floor space than a series of single thickeners having the same overall area. The eccentric tanks can be made of concrete, sidewalls of concrete with earthen bottoms, of steel, or any other suitable material. Only one operating mechanism saves power and usually not more than two traction arms are required.

Should any obstruction occur in any one of the tanks, it can be by-passed and removed without complete shut down of the Concen-Tank unit. For data on more thickening with less floor space at lower cost, circle PEP No. 72.

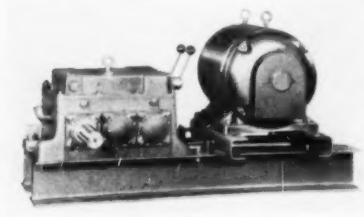


Marion's New 191-M Shovel

The Marion Power Shovel Company has just announced the newest power shovel, the 191-M, in its series of high-capacity, heavy-duty shovels. The 191-M was specially designed and engineered for open-pit iron and copper mines. Circle No. 70 for complete data about this fast-loading cycle shovel.

Variable Transmissions For Heavier Applications

The Turner Machinery Company, for over twenty years a manufacturer of power equipment, has announced three new models (2004, 3004, 5004) of multi-speed transmissions for use with prime movers rated up to 60 hp.



These units, available in from four to nine speeds, have resulted from over two years of engineering and test operation and are designed to control the output speeds of electric motors and internal combustion engines running at constant rates. For literature describing these units more completely, circle no. 76.

KEEP HIGH-MANGANESE STEEL OUT OF YOUR CRUSHER: The new electronic Detramp will spot high-manganese steel normally not removed by high-intensity surface magnets or magnetic pulley. This simple-to-operate, low in cost and maintenance unit, gives "around-the-belt" protection ahead of crushers. Find out how you can install one by circling No. 62.

BLASTERS HANDBOOK MEANS BETTER BLASTING: This new and completely revised handbook will save you money on all types of blasting at every job. See for yourself how the industry does it, reference charts and tables add to its usefulness. Contains the latest approved safety measures. A copy may be obtained for $1.75 from DuPont Powder Company, Explosives Department 2539-D, Wilmington 98, Delaware, or send $1.75 to *Mining World*.

SAVE A MAN WITH A CYLINDER: Whenever you have to push, pull, lift, lower, press, squeeze, tilt, turn, open or close anything by man power, the Ledeen cylinders can do it faster and cheaper. See for yourself in Bulletin 500. Circle PEP No. 61 to save manpower.

LOW PRICED ELECTRODES: A new hard-facing electrode giving a deposit of chrome, manganese, silicon, and iron alloy is available at low prices (¼ by 14 inch at $0.75 per pound in over 1,000 pound lots). The hard facing has very good shock resistance and has stainless qualities approximately equivalent to type 410 stainless steel. Available in ⅛, 3/16, and ¼-inch diameters. For further price and use information on this Wallex No. 2, circle No. 41.

GREENSBURG LOCOMOTIVES HAUL MORE AT LESS COST: On job after job, Greensburg storage battery locomotives have proved superior because they are custom-built for the job. Advanced engineering design makes them 20 percent more efficient. Longer battery life than any other storage battery locomotive of equal weight and battery capacity is assured. Find how to save transportation money by circling No. 42.

FINDS MINUTE AIR LEAKS: Leak-Tec is a new scientific development, specially designed for detection of air and gas leaks of all kinds. It spreads over cracks and crevices and creates a growing cluster of live bubbles wherever a leak occurs. Sensitive, fast, safe. Spray it on from flexible plastic bottles. These are light-weight, hand size, easy to carry. Find your air leaks with Leak-Tec. Circle PEP No. 43.

CATALOG FROM CRUSHERS TO BIN GATES: This new 36-page catalog is well-illustrated and gives tables on sizes, capacities, weights, and power requirements for Telsmith products. It's yours by circling No. 44 and covers primary and secondary crushers, gyratory breakers, jaw, gyrasphere, intercone and roll crushers, apron and plate feeders, scalping, sizing and washing screens, super-scrubbers, and sand classifiers.

CONDITION EFFICIENCY INCREASES FLOTATION RECOVERY: Denver Equipment Company Bulletin No. A2-B3 tells why the super-agitator and conditioner are so effective. Short-circuiting is eliminated, horse-power consumption reduced, and recirculation is taken care of in a manner that assures complete, uniform conditioning. Heavy duty construction and intense agitation at relatively slow propeller speed are important features. Drawings illustrate the operation and construction of the super-agitator and conditioner, and specifications and data are included to complete the bulletin. For a copy circle No. 45.

HOSE CLAMPS FOR EVERY PURPOSE: Circle No. 46 for a free copy of the new bulletin on the complete line of Le-Hi hose clamps. Complete information is given on all types and sizes, their capacities, and application. Illustrations show how to use the clamps to save you money.

FIBERGLAS HARD-BOILED CAP: A new type of safety head covering, the hard-boiled cap, features lighter weight, more air space and exceptional impact resistance. Adjustable headbands in sizes from 6⅜ to 7⅜ permit the cap to fit any head size. Circle 48 today.

UNSEEN FACTORS IN FLOTATION: This new bulletin of the Denver Equipment Company shows that unseen factors affect economic recovery and are not shown by assays. Make the same recovery in a better marketable concentrate for a premium smelter feed. Why an apparent need for a more costly finer grind may actually mean a coarser grind with improved classification which will yield greater economic return is explained. Find out for yourself from PEP No. 49.

STOP PINCHING ME, YOU PULLEY: If wire rope could talk, what would it say about correct handling? A new book attempts to give the answer. Your illustrated copy can be obtained free by circling No. 50.

NARROW GAUGE DIESEL SWITCHER: Baldwin-Lima-Hamilton Corporation is building a new Diesel locomotive in gauges from 30 to 66 inches for plant switching service. The new unit weighs 35 tons, has a starting tractive effort of 17,500 pounds. Speeds are 10.6 and 28.0 miles per hour. No. 59.

500 TYPES OF WIRE AND CABLE: This new 186 page catalog lists all types of wire and cables for mines, portable cords, building wiring, and telephone service. Comprehensive data are listed for construction and operating characteristics of wires and cables, as well as detailed engineering section. Everyone uses electricity, everyone uses wiring, everyone needs this catalog—its yours by circling No. 51 now.

CHAMPION OF CRAWLERS: The International TD-24 with its 124 drawbar horsepower is ideally suited for mining and construction work. Colored machine views, action shots, engine views, and specifications are shown in the new information catalog. PEP No. 52.

AIR-COOLED RADIAL COMPRESSORS: Capable of producing 80 to 125-pounds pressure are described in the new Worthington bulletin, PEP No. 53. Pictured and explained are articulated connecting rod, fan cooling of isolated cylinders, forced feed lubrication, and feather valve. Dimensions and weights, capacities, sizes and cross-section photographs are available for these compressors. Circle No. 53.

POSITIVE PROTECTION AGAINST RUST: The new VPI protects metal against rust without costly coating. This powder is also helping to reduce the cost of packaging metal parts, protecting

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them during storage and shipment. If you have a rusting problem at your mine, investigate VPI. Crystals can be blown into an area; they can be dissolved in water or alcohol and sprayed on the parts or product to be protected. It has been used as a rust inhibitor in hydraulic fluids and water soluble paints. Full data on VPI are available by circling No. 54 on the PEP card.

DO YOU HAVE POTHEADS AND TERMINALS? If so, and every mine does, you will want Anaconda's new catalog. It features both outdoor and indoor types with popular designs for transformers and switchgear. Complete design data, information, and instructions are included. The new catalog is yours for No. 55.

BECKMAN 10-CHANNEL ANALOG COMPUTER: This Ease Computer can be used as an equation solver, a simulator, or a tester. It can solve seventh order, and sometimes higher, linear total differential equations. It is low in cost yet sufficiently flexible to be successfully used by every industrial, research, and educational group working on dynamics. PEP No. 56.

BIN-VUE MATERIALS LEVEL INDICATOR: So simple you will wonder why you didn't think of it for your mill bin. Simple mechanical reactions to any dry bulk materials in bins assure you true signals and trouble-free operation. Try the Convair Bin-Vue. No. 57.

SEE ALL, TELL ALL TO TRUCK OPERATORS: The 16-page pamphlet, amusingly illustrated by cartoons, clearly tells how to figure such matters as operating speeds, required horsepower, weight distribution, turning radius, reduction, and gear splits. Numerous graphs, tables, and formulas give much useful information. If you want your free copy, circle No. 58.

NEWEST POWER IN PLASTIC: The Electric Storage Battery Company announces the Exide-Manchex battery for all small power applications. Output is up to 24 ampere hours at an eight-hour rate. This battery features exceptional ruggedness, with high power ability in greatly reduced space. Transparent cover and container, long-life Manchester positive plate, and double insulation are a few of the special features. For additional information, circle No. 47.

NEW CLEANER FOR MINE DRYS: For quickly cleaning dry and change houses, use Berman Chemical Company's new Saf-T-Klenz. It removes grease, oil, dirt, and grime by a chemical action harmless to clothes, skin, floors and drains, and leaves no slippery film. Circle no. 1.

PLACER AND SOIL SAMPLING: The Acker Drill Company's 16-page bulletin no. 25 illustrates and describes a wide variety of equipment for use in placer and soil sampling. Included are solid-tube, split-tube, and thin-wall samplers; spiral augers; interchangeable shoes; trap valves; and even the minor items you'll need for your sampling kit. Circle no. 2.

FASTER BEARING INSTALLATION: Link-Belt's two-piece housing for ball and roller bearings makes mounting and assembling fast and simple. Standard threaded bolts serving as jack screws raise the housing cap for the quick installation of adapter rings. Engineering data is supplied in bulletin no. 2550. Circle no. 3.

BUDA DIESELS FOR TOUGH GRADES: The extra horsepower and greater lugging ability of Buda's big Diesels are lowering haul costs and increasing output in many of the world's largest open pits. Descriptive Buda bulletins are available. Circle no. 4.

SAVE WITH KVS CRUSHERS, GRINDERS: Now available is a complete set of bulletins explaining the unique money-saving features of Kennedy-Van Saun jaw and gyratory crushers and ball and tube mills. Circle no. 5.

TRUCO BITS ASSURE HIGH FOOTAGE: The carefully set diamonds in the bits made by the Wheel Trueing Tool Company deliver maximum cutting power for increased footage. For further information, circle no. 6.

PAYLOADER—THE MINER'S HANDYMAN: The big 1½-yd. model HM Payloader has proven itself a valuable and versatile earth mover in and around mines and mills. It can excavate, strip, load, backfill, bulldoze, spread, pull, push, lift and carry. A Payloader catalog describes this and smaller units. Circle no. 30.

HI-POWERED AIR-DRIVEN DIAMOND DRILLS: Chicago Pneumatic's CP-55 diamond drill has the most powerful rotary air motor on any diamond drill. With a capacity of 500 feet of hole, the CP-55 is an outstanding performer in high-speed underground drilling. Get bulletin 318-2 by circling no. 16.

LONG-LIFE WIRE SCREEN: Flat-lying, oil-tempered wire gives Roebling screens long life with less logging and blinding by presenting 75 percent more wearing surface. For information on the types and sizes offered by Roebling's Wire Fabrics Division, circle no. 17.

SAFER, FASTER CAR COUPLERS: Willison automatic couplers require no manual assistance in either coupling or uncoupling—an important factor in mine safety. Either end of a car can be the front with these symetrical units—no lost time in reversing. Close coupling prevents damaging slack. Circulars nos. 1746 and 5240 have the details. Circle no. 18.

HI-STRENGTH BELT FASTENERS: Flexco fasteners and rip plates for making butt joints, bridging soft spots and patching or joining rips have the strength and durability required by heavy conveyor and elevator belts. The even strain distribution and natural troughing characteristics of Flexco fasteners are explained in bulletin F-100. Circle no. 19.

HI-POWER SCINTILLOMETER: The scintillometer made by the Engineers Syndicate, Inc. detects nearly 100 percent of gamma ray emission—one hundred times as sensitive as the Geiger counter. For complete information, circle no. 20.

MINING CATALOG: Increase drill footage by learning the specifications and applications of the many types of drill bits now available. Get Christensen Diamond Products' newly-published Mining Catalog by circling no. 9.

IMPROVED BATTERY LOCOMOTIVES: Double-reduction spur gear drives and anti-friction bearings are only two of the features that provide efficient underground haulage with Atlas storage battery locomotives. For complete information on the application of Atlas products as described in their catalog by circling no. 10.

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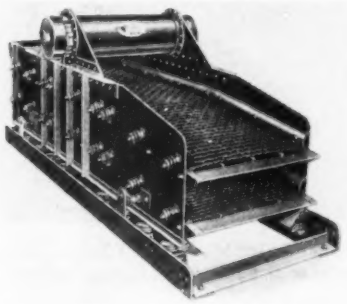
Lifetime Headmotion For Deister's Scalping Screen

Greatly increased sizing efficiency, as well as longer headmotion wear life, is now possible with the new UHS Deister heavy-duty scalping screen with new lifetime unitized headmotion, manufactured by the Deister Machine Company.

Built as a unit, the new lifetime headmotion features two-bearing construction, and runs in a bath of oil. Designed for extreme ruggedness, the new UHS scalping screen provides powerful but fully cushioned vibration, plus automatic screen cloth tension. The screen features Deister's opposed elliptical-throw action, which controls the movement of material on the screen for the greatest speed and efficiency of sizing. Advantages of the elliptical throw begin at the input end, where the material is thrown to the discharge end to increase stratification—or "thinning"—of the load directly under the input chute. Near the center of the screen, the elliptical-throw becomes a circular throw, bouncing material up and down for stratification efficiency. Below the center, the elliptical-throw reverses to a holding action, thus retaining the thinned bed of coarser material on the screen long enough to permit maximum grading.



Circle No. 77 and find out why this new screen can do a better job for you.

New Belting Bulletin Gives Tips On Longer Belt Life

The Barber-Greene Company has just published an eight-page, two-color belting bulletin. Circle PEP No. 82 for your free copy.

Pictured and discussed are these major causes of belt failure—ply separation, carcass deterioration, irregular plies, edge wear, and longitudinal seam failure. The literature shows that the initial factors leading to early failure are defects of design or of construction. Advanced engineering, years of field experience and research plus precision manufacturing, have produced a belt which overcomes the major causes of early belt failure.

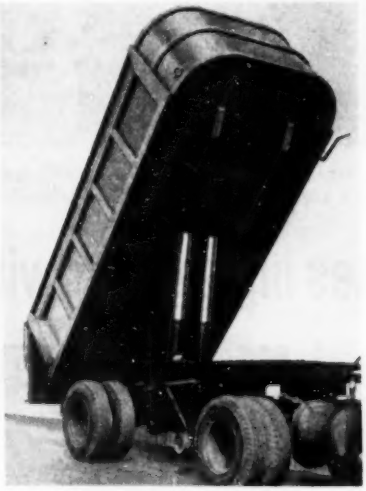
Unique belt selection tables are in two major sections simplifying a once complicated process. One two-page spread gives illustrations and specifications of the various belts. Use of the second two-page section is facilitated through the employment of a given example. Belt selection is accomplished by picking carcass and ply factors from an easily followed series of tables. These guides make it easy to choose the right belt for the job; belts for handling hot metal chips or stoker coal—for a permanent conveyor or a portable—for a new conveyor or a replacement.

Belts range from the light material handling belt to the heavy-duty belt for the most severe service. Included are the Hot Material belt and the Barprene belt which are made of specially compounded heat-resistant covers built to withstand the wear of extremely hot abrasive materials. The Barprene belt, made of neoprene, is especially designed to overcome the corrosive action of oil and grease.

Packaged Trailer Dump Bodies Now Available

The Galion Allsteel Body Company is now making a new series of single-axle, packaged, trailer dump bodies with capacities up to 20 cubic yards.

Known as Galion Model 12, the body is constructed of 10 gauge steel. It is 88 inches wide inside and has 32-inch sides and 44-inch ends. Standard equipment includes 12-inch steel removable side boards. Length can be varied up to 18 feet to provide any desired yardage capacity.



Dumping is handled by a Galion Model 77142 Hoist. This consists of two, 7-inch, twin ram single-stage telescopic cylinders. Rated hoist capacity is 18 tons.

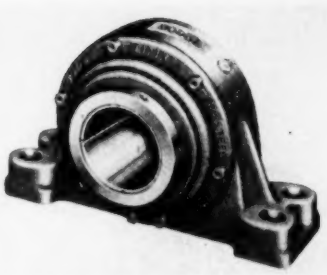
The trailer suspension is of heavy duty alloy main and auxiliary springs, one fixed and one adjustable radius rod, with flat top frame section. It is furnished with either a power fifth wheel or wet hose mounting. Tire sizes and brakes are available in several options to meet individual load and service requirements. Circle No. 75 for full information.

High Load-Carrying Dodge-Timken Roller Bearings

A new line of all-steel pillow bearings, providing high load-carrying capacity in a compact and rugged package, has just been announced by the Dodge Manufacturing Corporation.

These new bearings are a joint achievement by Dodge and the Timken Roller Bearing Company. High radial and thrust capacities, along with the stamina to take heavy-shock loads, have been provided within minimum dimensions and with far less than usual weight.

The bearings are fully self-aligning, with spherical outer race. They are available in both expansion and non-expansion types and have the adapter mounting which has proven so successful through the years. Double piston ring seals keep the lubricant in and dirt and dust out of the bearing mechanism. The bearings are sealed both on and off the shaft. They will be available in shaft sizes from 2 15/16 to 10 inches. Circle No. 73 for complete facts on this new bearing unit.



Tractor Maintenance Told in Cartoons

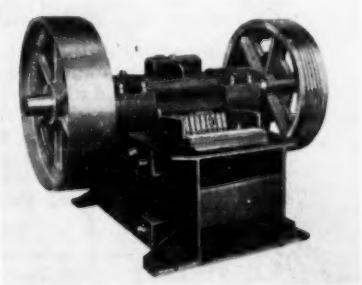
Another cartoon booklet devoted to equipment maintenance is now being offered by the Caterpillar Tractor Company. This booklet, "Maintenance Guide for Tracktype Tractors" tells in colored cartoons what happens when an owner and service technician compare job notes. The two men discuss basic methods of making tractors last longer and do better work at lower cost.

Operating adjustments are simply explained and proper care of tractor components, such as tracks, seals, fuel system and filters, is shown. Also featured is the opportunity to economize by having a dealer rebuild worn parts.

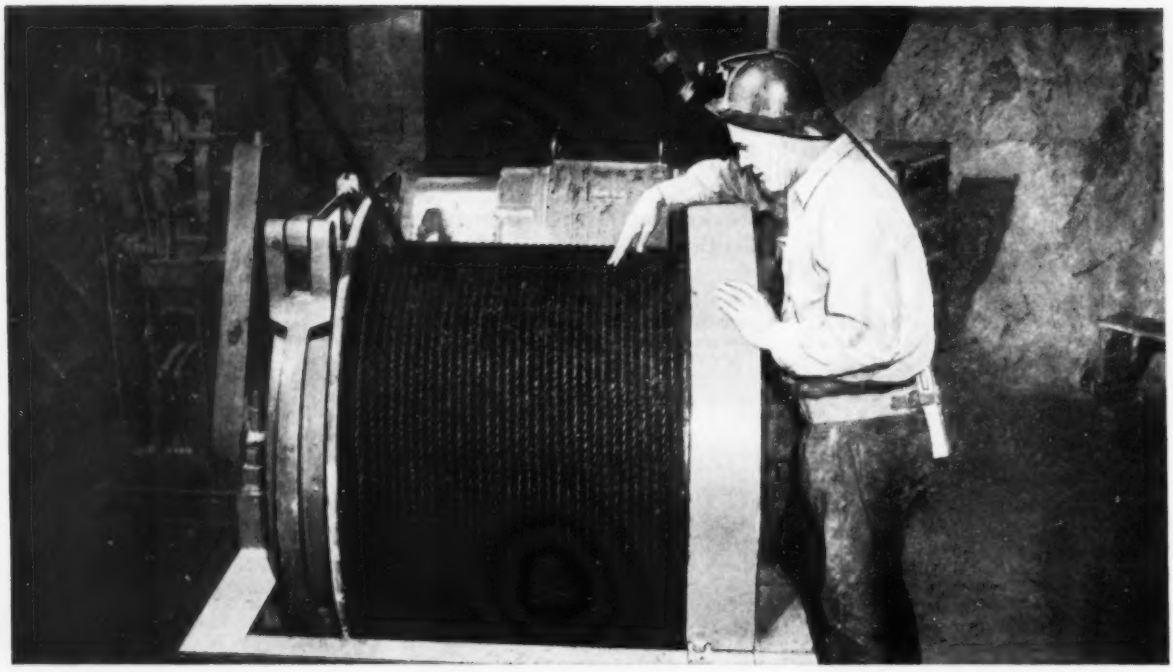
For your copy of the latest in this cartoon series, circle No. 78.

Light-Weight Jaw Crusher For High Tonnage Output

A revolutionary light weight 10 by 16-inch plain bearing jaw crusher is now available from Pioneer Engineering Works.



The new crusher features a single wall pressed steel base that is strong and rigid, and yet lighter in weight. The pitman bearing is a full round bronze sleeve bearing. Side bearings are bronze on the bottom half and babbitt on the top half. Bearings are protected by felt oil seals in each end of each bearing. Reversible jaw plates are of manganese steel. Production capacity will range from 4 to 40 tons per hour, depending on stage of reduction required. The approximate weight of the new crusher is 3,350 pounds. Circle No. 74 for your free copy of performance data for this new 1016 jaw crusher.



Lines last 6 times longer on this winze hoist in the Seeley Mudd Family's Coronado Copper & Zinc Mine, east of Tucson, since Supt. B. B. Gibbens made changes based on a Tiger Brand Specialist's wear study. Ropes now last 18 months instead of three.

Coronado Mine makes big savings with Tiger Brand Rope!

220 tons of ore daily are brought up from the Coronado Mine's Moore Shaft by these Tiger Brand wire ropes, yet they show only slight wear after almost two years of steady hoisting. One reason the ropes have held up so well is that a Field Specialist made sure in advance that they were right for the job they had to do.

"We've saved lots of money with the help of our Tiger Brand Specialist's advice on wire rope," says Mine Mgr. Fred E. Gray, above left, with Field Specialist J. J. Normart of Tucson. "By recommending the right rope for each job, Mr. Normart has helped us get longer, safer service from our Tiger Brand hoisting lines."

For any mining job you handle, rely on tough American Tiger Brand, the wire rope that's rigidly controlled by United States Steel from raw ore to finished product. To get all the stamina engineered into it, you're welcome to the services of a Field Specialist. Contact your local distributor or write Columbia-Geneva Steel Division, Room 1422, Russ Building, San Francisco 6.

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UNITED STATES STEEL

Entrenched Bureaucracy

When the article entitled "Resources for Freedom" appeared in the August issue of *Mining World*, we read it with interest. A first thought was that an analysis of the article would be in order, but a second reading brought the decision that such a review was impossible within the limits of this column. There are, however, certain observations which we wish to make.

The Materials Policy Commission is composed of five members. The chairman is a radio executive. The second member was graduated from a school of mines 30 years ago, but he reformed and went to another industry. The third member was a graduate in electrical engineering, but became a mining executive, with a strong international flavor. The fourth member is an expert in public administration, and the fifth member is the editor of a high-class slick-paper magazine. They are all very busy men, and it is self-evident that they did not personally write all of the 1,000,000 words in the five large volumes of the Commission report. Like the members of all such government commissions, they become the captives of their staff. We intend to examine that report in detail.

In forming the staffs for these commissions, as a result of insistence by the members, the secretary may be chosen from civilian life, but, more often, as a result of official hints, he is chosen from one of the departments. The secretarial staff will be supplied by the placement officer of Civil Service. They thus may all be members of the official oligarcy.

In all the history of the world there never has been such a successful mineral development as this country has had under our prospector and location system of free enterprise. It is the envy of every other nation. Thus far it has met the test of every national emergency. In spite of this success, the last few years have seen a regular plague of suggestions for changes in the mining code, mostly originating in government bureaus. It, therefore, comes as a great surprise to find that this commission has not only listened complacently to these new suggestions, but that they are now recommending the adoption of every one of these mining innovations, which the mining industry, both individual and corporate, has so bitterly fought during the last few years.

If the commission's suggestions are adopted we can say "goodbye" to prospectors and their angel grubstakers.

Why adopt a leasing system when it has proved such a dismal failure as applied to Indian lands?

The system of apex and extralateral rights was developed as a matter of necessity. Without them there could not have been the Cripple Creek and Leadville developments, and the population of Boot Hill would have been doubled.

"That permanent legislation entirely independent of the Reciprocal Trade Agreements Act be enacted authorizing unilateral elimination of import duty on any industrial material . . ." By the paragraph beginning as quoted, the commission would bypass Congress, and leave departments free to act as they please in such matters.

When did the departments resume the issuing of patents?

Our readers can readily finish the catalogue for themselves.

The Wanderer

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STANDARD ENGINEER'S REPORT

LUBRICANT Calol Vistac Oil

UNIT Rock drill-Ingersoll-Rand drifter

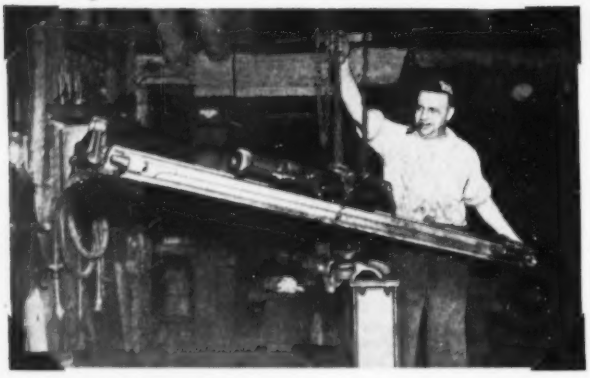
LUBRICATOR Line oiler

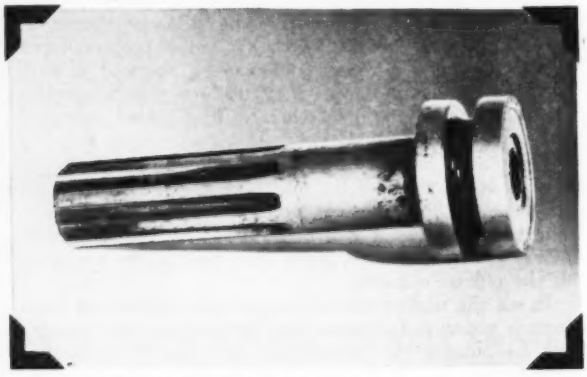
OPERATION Deep underground mining

CONDITIONS High humidity & temp.

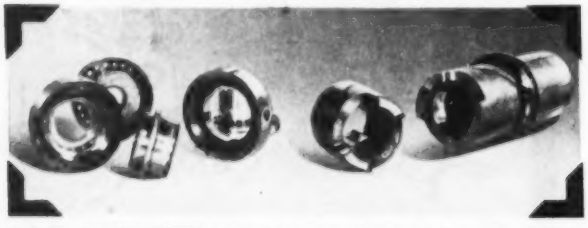
FIRM Sunshine Mining Co., Kellogg, Idaho

Only 0.001 wear on rock-drill piston in 120 shifts!





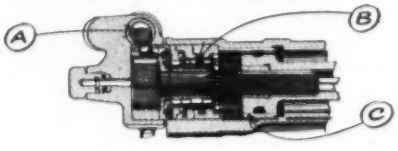
ON THE 3100-FOOT LEVEL of the famous Sunshine silver mine, this drifter, lubricated with Calol Vistac Oil, was in steady service for more than two months before coming in for service. When disassembled by "Drill Doctor" Dave Farnsworth, the piston "miked" only 0.001 inch wear despite the tough conditions in which the drill works. Working face is 400 feet below sea-level. Humidity is around 90 with atmosphere at a constant 75°F. After cleaning, the piston and other parts were put back in service.



VALVE-CHEST ASSEMBLY, chuck and chuck jaw from the drifter. Note the absence of lacquer or corrosion on air-valve parts. Because Calol Vistac Oil has held air-tool wear to the minimum and is approved by the miners, Sunshine Mining Co. has used it for more than 10 years.

REMARKS: Besides providing good air-tool lubrication without excessive vapor or bad odor, Calol Vistac Oil is excellent for heavy-duty plain bearings, reduction gears, motor gear heads, etc. It comes in several grades and may be applied by wick-, ring-, and drip-feed oilers.

How CALOL Vistac Oil cuts costs in air-tool equipment



A. Atomizes quickly and completely—carries evenly over all parts. Does not fog excessively and has no unpleasant odor.

B. Additives help form tenacious, oily, pressure-resistant film in wet or dry conditions—cuts wear and power loss. Small quantity lubricates efficiently.

C. Resists high temperatures and oxidation. Stays fluid at low temperatures.

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Resurrection Leases Famed Little Johnny Gold Mine

The Ibex Mining Company has granted a lease and option on its mining claims in the Leadville district of Lake County, Colorado, to the Resurrection Mining Company.

Included in the option was the famous Little Johnny mine, which is credited with a gold production valued at $60,000,000. The entire Ibex group developed through four deep vertical shafts has produced over $150,000,000 worth of ore, nearly all gold, but in recent years substantial tonnages of zinc-lead-silver-gold ore have been mined.

Initial Resurrection operations consisted of granting several leases on Ibex ground in areas accessible from the Yak Tunnel.

Resurrection is equally owned by the Newmont Mining Corporation, United States Smelting, Refining and Mining Company, and the Hecla Mining Company. Barney Greenlee of Leadville is Resurrection general superintendent.

Develop Copper-Uranium Mines in White Canyon

Cooper and Bronson's Happy Jack uranium-copper mine in White Canyon, San Juan County, Utah has developed a large tonnage of good-grade mill ore. Development is being continued under direction of the two partners.

In the same area, the Vanadium Corporation of America is continuing development at its Uracop copper-uranium claims. D. W. Viles, vice president in charge of mining, directs the corporation's White Canyon mine and mill.

A large number of prospectors and independent mining operators are doing development work on their claims with the intentions of shipping ore in the future to the Vanadium Corporation of America's White Canyon plant.

COLORADO

James P. Webb and Melvin Gaymon, operators of the *Pittsburgh* placer claim in Breckenridge, Colorado, have uncovered a five-foot vein of lead and zinc ore while doing some surface work. Present plans call for further development of the vein by stripping with a dragline, and, at the same time, sinking on the vein. The ore will be hand-sorted as it is stripped. The fines will be screened off and run through sluice boxes to recover the lead. Meanwhile, other veins in the area will be uncovered by bulldozer and stripped by dragline.

Development work started last spring is continuing at the *Bachelor* and *Syracuse* mines north of Ouray, Colorado, according to manager J. R. Sonza. Mine crews are driving a raise from the 300-foot level to prospect for mineralization found on the 200-foot level. Meanwhile, shipments of lead-silver ore are being made regularly to the nearby American No. 1 custom mill of the *American Zinc, Lead & Smelting Company*. The mines are the property of the *Bachelor Development Company*.

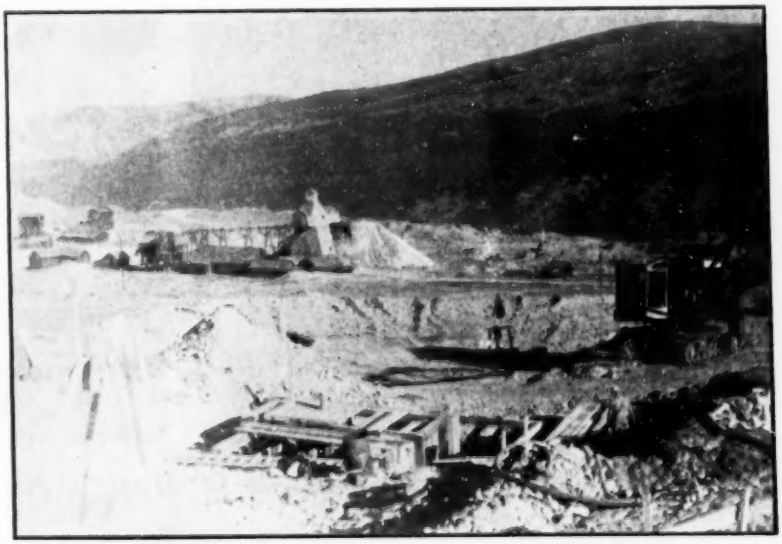
In the Leadville mining district of Colorado, the *Newmont Exploration Company* has five surface diamond drills and one underground diamond drill in operation. Three drills are being used in Iowa Gulch south of Leadville, and two are in use in Big Evans Gulch east of the city. According to reports, several holes have been drilled to a 1,000-foot depth. Newmont Exploration also completed an extensive diamond drilling project recently near the *Vulcan* mine, Gunnison, Colorado.

A low-level adit begun in 1949 was recently completed at the *Grizzly* mine of the *Lupton Mining Company*, located near Silver Plume, Colorado. The new lower adit, partially financed by a $65,000 participating loan from the Defense Materials Administration, is designed to eliminate a water drainage and hoisting problem at the Grizzly and to open a large body of lead and silver ore. According to Major Ellis P. Lupton, head of the company, by driving the adit and a 343-foot raise, several thousand tons of mill-grade ore have been blocked out on three sides. He also reports that his miners are driving a drift on the Grizzly vein and are in good ore. Output is processed at Lupton's Commonwealth flotation mill at Georgetown, which is operating on a three-shift-per-day basis.

The *Leadville Lead Corporation* is starting a diamond drill exploration program at its Dauntless tunnel in Park County, Colorado. Exploration, aided by a Defense Minerals Exploration Administration loan, has been in porphyry to date. The tunnel was reopened in 1949 as part of an overall expansion program.

The *Venture Leasing Company* has begun operating its new 50-ton-per-day differential lead-zinc flotation mill at the *Gold Prince* mine in San Juan County, Colorado. The mill, located at the lower tunnel of the Gold Prince, was built with the aid of a $23,000 Reconstruction Finance Corporation loan. John Cook, Leslie Larson and William Gianetto are partners in the company which built the mill last summer.

Earl Crowl, previously the largest stockholder in the *San Juan Gold King Mines, Inc.*, has reportedly purchased the



ASARCO DIGS DEEP LEADVILLE SHAFT

The American Smelting and Refining Company has started sinking its large new Irene shaft on the top of Johnny Hill in the Leadville district, Colorado. Pictured here is the collar of the three-compartment, 17 by 7-foot rock section shaft which will be sunk over 1,000 feet. The picture was taken looking northwest and plainly shows the Ibex No. 2 shaft in the background. A Riddell mucker will be used for sinking the shaft. It will connect with the Irene winze, which the company sank several years ago from the Eclipse shaft workings to develop the down-faulted Leadville Blue Limestone. On completion of the shaft it will be possible to mine the lead-zinc-silver-gold ore developed by the smelting company during the past several years. At present, development ore is hoisted from the Irene winze, trammed to the Eclipse shaft, and hoisted to the surface. J. Fred Johnson, western manager of mining operations for ASARCO, is supervising the Leadville operations.

entire property and plans to begin preliminary improvements before winter. First work will be done on the American tunnel, where known veins will be developed by drifting and drilling. The famous gold-producing Colorado property, which has been closed for 30 years, had a production record of over $8,250,000 during the years that it was operated.

Ozark-Mahoning Company, an Oklahoma firm, has to date invested approximately $1,000,000 in its fluorspar mining and milling operation in Colorado's North Park area. Newest development is the construction of a 250-ton-per-day flotation mill about five miles north of Cowdrey. Sixty-five men are employed at the mill, of which R. K. Wisco is general superintendent and M. P. Cloonan is plant superintendent.

U. S. Vanadium Company largest single producer of uranium in Colorado, has doubled the capacity of its mill at Uravan, Montrose County, Colorado. U. S. Vanadium operates a second uranium-vanadium mill at Rifle, Colorado, and recently completed a remodeling of its uranium-vanadium ore sampling plant at a cost of $48,000.

Climax Molybdenum Company, Climax, Colorado, recently acquired the world's largest primary gyratory crusher for use at the new Storke Level crushing plant. The 500-ton machine, built by the *Nordberg Manufacturing Company*, has a 60-inch feed opening and stands as high as a three-story building.

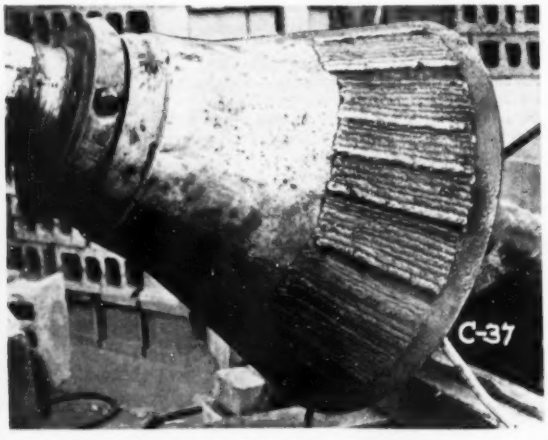
Shipments of ore reportedly will be forthcoming soon from the *Park View* uranium-vanadium mine in Mesa County, Colorado. A new road has been completed to the property, recently purchased by C. E. Wright of the *D. & N. Lead Mining Company*.

Quantity production of cobalt should begin "in the relatively near future" at *Howe Sound Company's* chemical refinery near Garfield, Utah, according to H. H. Sharp, Howe president. *Chemical Construction Company*, present operators of the plant, had expected an earlier opening, but at present repairs are being made on the stainless steel machinery and officials say they are still in the process of "tuning up." The plant has a capacity of more than 2,500,000 pounds of cobalt per year, and will make 90 percent of all cobalt produced in the United States when it is in full operation. It will also be the largest producer of the vital defense material in the Western hemisphere. Chemico and Howe Sound are collaborating on the first commercial application of a new reduction process, and will convert concentrates from Howe Sound's Idaho cobalt mine.

The shaft being sunk at the *Yellow Canaries* uranium claims of the *Howell Mining Company* is now down 250 feet. Located in the Marysvale district of Utah, its bottom is believed to be about 100 feet lower than any other working in the area. Some uranium ores were found during the process of sinking, but not in large enough amounts to be commercially feasible. The shaft sinking was started in September 1951, and three men have been working on it continuously since then.

Uranium work has progressed impressively in the Craven and Cole Canyon areas of South Dakota's Black Hills, according to Senator Karl Mundt. A new ore loading dock is nearing completion at Edgemont on a spur track of the Burlington Railroad, and the U. S. Atomic Energy Commission has asked for bids on core and non-core drilling. Prospecting chances are enhanced even further by the discovery of uranium in the Lakota sandstone.

Production increased during the second quarter of 1952 at the *Homestake* Mine, property of the nation's largest gold producer, the *Homestake Mining Company*. A state tax report showed that the mine produced 303,739 tons of ore and that the gold extracted was valued at $4,130,557.32. Silver in the ore was valued at $20,688.08. Production during the first quarter of 1952 was 244,536 tons, with a value of $3,559,401.51.



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Northwest Convention Set For December Meeting

The 58th annual convention of the Northwest Mining Association which will be held in Spokane, Washington, on December 5 and 6, will feature a technical session on mechanized mining in Washington's Metalline Falls district. This session will be held in the afternoon under the chairmanship of Dale I. Hayes, western manager of American Zinc, Lead and Smelting Company.

The opening session under the chairmanship of A. E. Weissenborn, Spokane geologist for the United States Geological Survey and the Defense Minerals Exploration Administration, will highlight mining developments in Washington, Idaho, and Montana.

The technical session on Saturday, the 6th, will be jointly sponsored by the Columbia section of the AIME with J. C. Kieffer, assistant manager American Smelting and Refining Company's Coeur d'Alene district, as program chairman.

Chester H. Steele, general manager of western mining operations of the Anaconda Copper Mining Company, Butte, Montana, will be the featured speaker at the Saturday noon luncheon.

Robert J. Towne, manager of Towne Equipment Company and Northwest Association trustee, is general chairman of the convention and has arranged a dinner dance for Friday night, the traditional sourdough breakfast for Saturday morning, and the annual banquet and dance for that evening.

Sullivan Building Idaho Sulphuric Acid Plant

A certificate of necessity has been granted the Sullivan Mining Company by the Defense Production Administration to construct a $5,352,370 sulphuric acid plant near Kellogg, Idaho. The company will be allowed to write off 70 percent of the cost over a five-year period.

Construction is now under way, and the plant is scheduled for completion by the end of 1953 or early in 1954. It will produce 250 to 300 tons of sulphuric acid daily. The acid will be obtained from gases given off in the zinc concentrate roasting process at the nearby electrolytic zinc plant. Engineering for the plant is by Singmaster and Breyer, New York, New York metallurgical and chemical engineering consultants. The Leonard Construction Company of Chicago designed the plant, and it is being built by Stearns-Rogers Construction Company of Denver.

Production at the electrolytic zinc plant has been curtailed 20 percent because of the recent power shortage in the Pacific Northwest. Interruptible power supply by the Washington Water Power Company was cut off when the Bonneville Power Dam Administration decided to drop such power until rains increased the water supply. This meant a loss of about 1,000 tons of high-grade zinc monthly, reports Superintendent Wallace G. Woolf. However, sufficient stocks of slab zinc are maintained by the company to offset this lower production for about three months.

Sullivan Mining Company is owned jointly by Hecla Mining Company and Bunker Hill & Sullivan Mining and Concentrating Company. The Bunker Hill smelter was not affected because the smelter's power supply is on a firm basis.

Mullin Mines Company, headed by James Collard of Golden, Idaho, has undertaken a $12,400 DMEA tungsten exploration project at the *Tungstar* group in the Ten Mile district of Idaho County. The government will put up $9,300 of the cost of surface trenching and bulldozing, and installation of slusher and washing plant equipment.

Lucky Friday Silver-Lead Mines has started westerly exploration of its vein system in the Hunter district of the Coeur d'Alenes, Shoshone County, Idaho, following leasing of 99 acres of adjoining *Gold Hunter* ground from *Day Mines, Inc.* The lease calls for a royalty of 14 percent of net smelter returns. Between 400 and 600 feet will be driven on the 2,000-foot level in Lucky Friday ground before reaching the Gold Hunter property. Drifting is underway on the same vein in which the Lucky Friday has opened up, on the east drift, a shoot of continuous ore over 700 feet in length.

Mascot Mines, Inc., has started development of a new No. 10 level at the *Little Pittsburg* mine in the Pine Creek district of the Coeur d'Alenes, Idaho. The No. 9 level, now being brought into production, is yielding millheads running between 7.5 and 9.0 percent lead-zinc, according to Claude E. Nugent, secretary-treasurer.

Lucky Six Mining Company of Julietta, Idaho has been incorporated by Donald Cantril, John Longeteigs and Alex McIntosh of Southwick, H. C. Freeman and Harold V. Freeman of Julietta, and Frank Cantril of Kendrick.

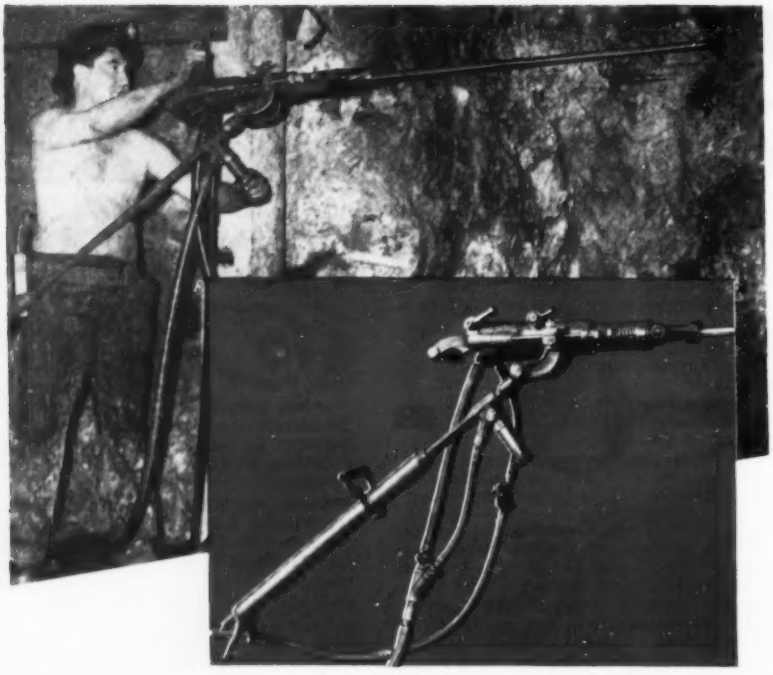
Silver Star-Queen Mines, Inc., has built a new compressor house, installed a 315-cubic-foot compressor, completed a new sawmill, and purchased a six-room house on adjacent ground to alleviate a housing shortage. Sixteen cars of ore have been shipped since production was started at the Blaine County, Idaho property last June. Nat T. Davis is president.

Polaris Mining Company of Wallace, Idaho which recently took over *Silver Summit Mining Company* in a merger,

Pacific Aerial Surveys, Inc.

ALCOA'S NEW $45,000,000 SMELTER

The Aluminum Company of America's new $45,000,000 smelter has been officially opened at Wenatchee, Washington. Although not completely finished, pouring of aluminum began late in June. Two of the four potlines have now been finished, and complete operation of the plant is expected early in 1953. Annual output will then be 170,000,000 pounds. The power needed to produce this amount of aluminum—170,000 kw—will be supplied by the Bonneville Power Administration and the Chelan PUD's new Rock Island Dam facility. When in full production, the plant will require 13 railroad cars of supplies daily, and will ship out 35 carloads of aluminum pig and ingot each week. W. N. Farquhar is works manager, and G. T. Holmes is aluminum plant superintendent.



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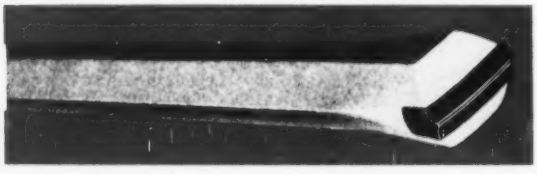

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has started exploring the main Silver Summit vein at the 3,000-foot level. This structure is about 950 feet south of the productive No. 3 vein. It will be followed westerly for 2,000 feet, company officials have announced.

Golconda Lead Mines, another Shoshone County, Idaho producer, has unwatered old shaft workings to below the 1,600-foot level. It is retimbering the station at that horizon preparatory to unwatering the bottom 1,800 level and carrying out extensive development work there. Some of the recent production has been from adjoining *Square Deal ground*.

Nabob Silver-Lead Company's concentrator in the Pine Creek district of Idaho now is treating ore from the recently opened Mascot vein in the *Nabob* mine. Several stopes have been started. Mill feed also has been coming from lessee operations in old upper workings on the Denver vein. Additional exploration of the Nabob vein is getting underway.

Gibbonsville Mining and Exploration Company expects to put its new 400-ton zinc-lead-silver flotation plant into operation about November 1, according to Earnest E. Eddy, manager. The mill was built with the aid of a $62,000 RFC production loan to treat an estimated 140,000 tons of mill tailings. These tailings were washed down the south fork of the Coeur d'Alene River years ago from the Wallace-Burke area and collected two miles west of Kellogg. The tailings are said to contain 2.27 percent zinr, 2.71 percent lead, and 2.07 ounces of silver to the ton. Walter C. Clark of Seattle was reelected president recently.

Kootenai Dike Mines, Inc., is planning to unwater and deepen a 100-foot shaft at its *Idamont* property near Leonia, Boundary County, Idaho, according to Dr. Ray E. Currie of Oakland, California, who is president. Ben Chamberlain of Moscow and Orofino, Idaho, has been named manager of mine operations.

Western Consolidated Mines, Inc. has made substantial progress in its rehabilitation and development of the *Ophir* mine in south central Idaho. The firm started development work in June 1950. Since then many of the old workings have been reopened and new exposures made on the vein body by tunnel and trenching. Ore samples reportedly carry gold and silver values. The original 285-foot, two-compartment vertical shaft has been reopened to the 205-foot level; a complete mine camp has been built; and a 100-ton flotation mill has been installed. The mine was closed down in 1890.

The *Polaris Mining Company* vein system, productive in upper levels but virtually barren in intermediate levels, is yielding rich silver ore at deep levels opened from the adjoining *Sunshine Mining Company* workings, officials have announced. Development work from Sunshion's 3,400-foot level disclosed a 200-foot oreshoot averaging 4.4 feet in width and 93.33 ounces of silver per ton. Additional length of mineralization has been opened on the same level, and on the 3,700 level (1,000 feet below sea level and a mile below the outcrop) the same vein is yielding "excellent" ore with indications that the shoots will extend a considerable distance below the level. The Polaris veins now are providing an important part of production shared equally by Polaris and Sunshine. In recent years, Polaris income has been largely from its share of the Omega and Rotbart areas of the Chester vein system, north of the Polaris system.

Montana Coal & Iron Company is driving a 600-foot tunnel to expose cobalt-copper veins at a depth of 200 feet below the surface at property in the Blackbird mining district of Lemhi County, Idaho. The work is being carried on under a $23,000 DMEA contract.

MONTANA

Amador Mining Company has given up an exploration project at the old *Amador* mine on Cedar Creek, south of Superior, Montana. Company officials said that extensive work carried on this year included unwatering of the shaft to the 700-foot level and clearing 7,000 feet of tunnel. The vein which had been worked by earlier operators was found to be still in place on the 700-foot level but was too low in grade to be mined at a profit, running from 0.07 percent to 3.41 percent copper. The recommendation to cease any further expenditures on the property was made by Irving G. Irving, representing the Galigher Company of Salt Lake City. The work was being done under a $72,190 DMA project.

United States Steel Company has taken an assignment of a 99-year lease held by S. A. Cummings, et al, on a fluorspar property southeast of Darby, Montana, and has started shipments of fluorspar to its Geneva Works in Utah. Owners of the 11-claim property are R. D. Flightner, Lester Thompson, and A. O. Cumley, all of Darby. They will receive royalties depending on fluorspar grading.

A good grade of lead ore has been found by diamond drilling beneath the present lowest level at the Superior, Montana, property of *Nancy Lee Mines, Inc.*, according to Robert H. Svendsen, company geologist and mining engineer. Deeper drilling is planned.

Caledonia Silver-Lead Mining Company of Kellogg, Idaho, has announced that it has optioned six gold mines in Montana's North Moccasin mining district, and plans to start immediate prospecting of the 1,000 acres involved. The mines, all early-day producers, are the *Kendall, Barnes-King, Santiago, North Moccasin, Mule Shoe* and *Horse Shoe*.

Lexington Silver-Lead Mines, Inc., has shipped a carload of concentrate from its mill at Niehart, Montana. The mill is treating dump ore taken from upper levels more than 50 years ago and discarded because it was not of direct shipping grade. The mine is being readied to resume production. J. A. Allen of Spokane is president.

A certificate of location for a placer mining claim on 120 acres in the Yellowstone County mining district of Montana has been filed with the county clerk at Billings. The claim is for the mining of bentonite and other minerals, and covers lot 10 and SW ¼ SE ¼, Section 30 T. 1 S., R. 26 E. and NW ¼ NE ¼, Section 31 T. 1 S., R. 26 E. A shaft five by 10 feet, and three feet deep, has been sunk in the center of Lot 10 Section 30, according to the location certificate. Signers include Lloyd Hatch, Clarence W. Avery, Fred W. Henderson, Sr., Grant F. Lampert, Richard D. Shay, and Oscar R. Burnside, each having one-sixth interest.

OREGON

Chrome concentrates assaying nearly 48 percent Cr_2O_3 have been shipped to the government purchasing depot at Grants Pass, Oregon by Bert Hayes of John Day, Oregon. He is mining chrome ore from the *Dry Camp* mine.

A 50-ton-per-day chrome concentrator is being built by Paul Littell and J. S. McKee in Grants Pass, Oregon. It will treat ore from the *Black Bird* mine near the mouth of Swede Creek, leased from Pete Neubert of Grants Pass. Littell and McKee, along with the *Idaho Canadian Dredging Company*, have built a mill on the *Eagle* property north of Bandon in Coos County to process black sand. The mill has 14 tables; magnetic separator will be added. Recoveries are expected in gold, platinum, chromite, magnetite, ilmenite, garnet, zircon, and monazite. George Murphy is in charge.

Ashland Mining Company is mining chromite by open-pit methods at the *Shady Cove* prospect near Galice in Josephine County, Oregon. Ore is trucked to the firm's mill near Ashland. The company also is stock-piling tungsten ore mined from the *Mattern* deposit near Ashland.

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Fred Gardner of Harbor, Oregon, has discovered chromite in the Vulcan Peak district of Curry County. The deposit consists of stringers up to four feet in width in sheared and serpentinized saxonite and dunite. A small tonnage has been mined.

Pacific Carbide & Alloys Company is producing agricultural limestone at its Portland, Oregon plant from limestone quarried near Enterprise, Wallowa County, Oregon.

Mines Management, Inc., of Spokane, Washington recently made initial shipments of concentrates from its 50-ton Advance mill near Northport in Stevens County, according to W. R. Green, president. A car of zinc concentrate went to the Sullivan Mining Company's electrolytic zinc plant near Kellogg, Idaho, and a car of lead concentrate to Cominco's smelter at Trail, British Columbia. Most of the ore milled was from development work in the firm's *Advance* mine six miles south of Northport. At the company's *Iroquois* mine, three miles northeast of Leadpoint, drifting is underway to check on a diamond drill core which showed a better than average grade of ore.

Mount Rainier Mining Company of Seattle, Washington, has obtained DMEA approval of a $3,000 copper-molybdenum exploration project in Glacier Basin in Mount Rainier National Park. The company, owning three patented lode claims, proposes to reopen two old tunnels on the *Snowflake* claim for examination and sampling.

Grandview Mines of Spokane, Washington is exploring five prospects in Stevens and Pend Oreille counties. Surface stripping has uncovered promising zinc showings one mile west of the *Anderson* open-pit zinc mine and diamond drilling is planned. On ground northeast of the Anderson, diamond drilling is being carried on following churn drilling through overburden. Surface bulldozing and diamond drilling also are underway at the *Plug* prospect, near the *Farmer* mine, and on Currant Creek. In Pend Oreille County, bulldozing has disclosed fair zinc mineralization at the firm's *Jim Creek* holdings southwest of the Metaline Falls district, home of the *Grandview* lead-zinc mine.

Dominion Lead Mining Company of Colville, Washington has mailed shareholders liquidation checks totaling $29,067 or 6⅔ cents a share after selling its *Old Dominion* silver mine to Earl B. Gibbs of Colville, and Ira B. Hunley of Spokane, for $35,000. Lee S. Wood is secretary-treasurer. The new owners have reopened old workings and are probing for new ore bodies.

Diamond drilling at the *Admiral* mine, near Leadpoint, Washington, has disclosed ore under the present lowest operating level, according to W. C. Hawes, secretary-treasurer. New ore also was found in a horizontal drill hole and an old crosscut will be extended to it. Milling of zinc-lead ore from old stopes has been resumed following mill improvements.

Northwest Magnesite Company has put into use a new steel tram discharge terminal at its Stevens County operations, in Washington, reports Howard R. Ziebell, general manager. The terminal is at the main Chewelah reduction plant at the end of a series of tramways which carry ore 13 miles from the Red Marble quarry. It was fabricated by *Riblet Tramway Company* of Spokane to replace an old wooden terminal.

The Washington state Division of Mines and Geology is making an economic study of mines in the Colville area of Stevens County. C. Phillips Purdy, Jr. division geologist, is in charge. Findings will be published along with a geologic map of the area next spring, according to Sheldon L. Glover, division supervisor.

Pend Oreille Mines and Metals Company is adding four duplex units to the 50 prefabricated houses it set up near Metaline Falls, Washington, last year for its workers.

Spokane and Kittitas, Washington men, headed by Ralph R. Weeks, Spokane attorney, have formed a partnership to mine a large oil shale deposit 10 miles east of Ellensberg. The Washington state highway department formerly took the material for road ballast and surfacing purposes.

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White Pine Copper Project Making Rapid Strides

The White Pine Copper Company, a subsidiary of the Copper Range Company, has received its first disbursement of $4,861,105, under the $57,185,000 loan authorized by the Reconstruction Finance Corporation to develop the new copper mine at the White Pine property in Ontonagan County, Michigan. When in full production by the end of 1954, 36,000 tons of copper is to be produced annually.

With some 800 construction workers swarming over the area, work on the project is proceeding rapidly. Headway is being made at the mine site, the town site, and in the residential section. Most of the 100 acres needed have been cleared and leveled. A good start has been made on the 14-mile railroad extension from Bergland, and on three workers' dormitories, a staff dormitory, service building, boiler house, water treatment plant, power station, mine buildings, and hospital.

The Upper Peninsula Power Company is building a 20-mile, 69,000-volt power line from its Victoria hydroelectric plant near Rockland to the mine. The line will supply power during the present construction and later will serve permanently for the White Pine townsite. The mine will eventually have its own $15,000,000 power plant for mining, milling, and smelting operations.

Callahan Zinc-Lead Company, Inc., operator of lead-zinc mines and mills in Colorado and Nevada, and gold placers in Alaska, is diversifying its operations. It will explore for monazite-columbite and rutile in Aiken County, South Carolina. The government has awarded a DMEA $37,960 contract to them, the government's share being $31,506.80.

The *Bethlehem Steel Company* is constructing one of the world's largest conveyor belt systems at its Lackawanna, New York steel plant. The belt is more than a mile long and is capable of carrying 6,000 tons of iron ore per hour. Being built at a cost of $5,000,000, the system is expected to be completed by next summer. Limestone and iron ore will be transported from the unloading docks to storage yards. The belt is also reversible so that iron ore from the new storage yard can be brought to the furnaces when needed.

An exhaustive study of all coal seams in the Appalachian Mountain region around Fairmont, West Virginia, will be undertaken by the *Pennsylvania Coal & Coke Company* in the hope of finding recoverable quantities of germanium. The mineral ranks with titanium and uranium as a rare but highly essential mineral. It is now in particular demand because of its use in electronics. Much work has been done in England on the recovery of germanium from coal and flue dust. It is reported that the program to be undertaken is in cooperation with the *Eagle Picher Company*, a large producer of germanium.

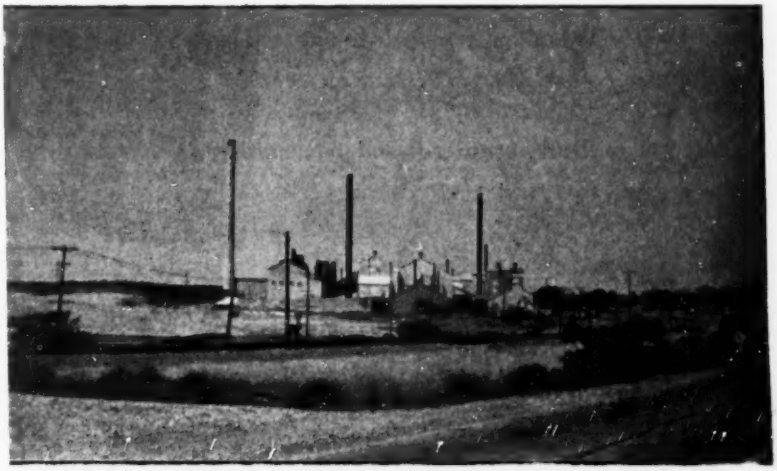
The *New York Central Railroad* has opened its new $1,500,000 railroad yards at Watertown, New York, to serve the St. Lawrence, Adirondack, and Ottawa division which is the key point in the shipment of iron ore from adirondack mining areas to the steel mills of Pennsylvania. This represents the largest single modernization program ever undertaken by the St. Lawrence division. Facilities are provided for Diesel engine repair, and all steam locomotives have been replaced with Diesel.

The expansion goal for tungsten ores has been amended. The revised goal, consisting of domestic production plus imports, has been set at 40,000,000 pounds of contained tungsten per year in 1954. (The goal does not apply beyond 1955; this will be determined when the requirements-supply situation is reviewed at a later date.) The present revision provides for an increase of 6,000,000 pounds in the annual rate previously established earlier this year, or an increase of 31,000,000 pounds over the 1950 rate of new supply of 9,000,000 pounds. Domestic production of tungsten concentrates in May and June of this year exceeded consumption for the first time since the third quarter of 1949.

The Defense Materials Exploration Administration has approved a $4,100 loan for *Yancey Mica Mines, Inc.* to explore for mica in Yancey County, North Carolina. The government's share will be $3,690.

Titanium and titanium alloys are being produced by *Republic Steel Corporation* at its steel plants in Canton and Massillon, Ohio. Production is limited and is under strict allocation by the government.

Operations have started at the first commercial unit in the United States for the recovery of uranium as a by-product of phosphate rock. The unit is a part of the plant of the *Blockson Chemical Company* near Joliet, Illinois. Three other full-scale recovery units are already under construction. *International Minerals & Chemical Corporation* and *Virginia-Carolina Chemical Corporation* are building near Mulberry, Florida, and *Texas City Chemicals, Inc.* is building a recovery unit at Texas City, Texas. All have contracts with the U.S. Atomic Energy Commission.



EAGLE PICHER ADDS TO GALENA SMELTER

The Eagle Picher Company will shortly start construction of a $4,000,000 zinc roasting and sulfuric acid plant at its lead smelter near Galena, Kansas (shown above). Completion is expected during the early part of 1954. Proposed output will be about 240 tons a day of sulfuric acid, the major portion of which is already under contract to the Missouri Farmers Association which plans to construct a phosphoric acid and fertilizer plant nearby. A certificate of necessity has been granted by the Defense Production Administration approving accelerated depreciation of the plant for income tax purposes. The DPA has authorized the company to write off 70 percent of the total cost.

Two new open-pit producers on the Cuyuna Range will contribute to 1952 shipments. The *Rabbit Lake* mine at Cuyuna, Minnesota, operated by *Pickands, Mather & Company*, is in the east part of what was once Rabbit Lake before it was pumped out and dredged to make the ore body accessible. The Rabbit Lake deposit contains a substantial tonnage of ore. It is a shovel-truck operation. the *Manuel* mine at Crosby, Minnesota, with an undetermined tonnage, is a *Zontelli Brothers, Inc.* property. With the washing plant completed, the mine will enter the shipping list soon. Zontelli Brothers also operate the *Virginia* mine at Trommald, which was stripped by them in 1947, and have leased the *Gorman* pit at Randall, Minnesota, which the firm stripped under a contract for the *Pacific Isle Mining Company*. Pacific shipped 34,300 tons from the Gorman in 1951.

M. A. Hanna Company mines on the Cuyuna Range in Minnesota are operating on a seven-days-per-week schedule. Stripping is being continued at the *Mallen*, a new mine, while the 7-W. dragline is loading surface material onto the conveyor system at the *South Alstead*. An extension is being built on the beneficiation laboratory at Hanna's *Patrick* mine at Cooley. The finished building will be 30 by 45 feet. At the company's *Buckeye* mine, both stripping and ore washing are being carried on 20 shifts per week. The *Morton* dragline-conveyor system is operating 21 shifts per week. Foundations have been laid at the Morton for the new inclined skip hoist. New equipment for the proposed ore handling system is arriving regularly.

The Office of Price Stabilization granted a 75 cents per ton increase in the ceiling price of merchant ore in the Lake Superior district on September 12. The new base ceilings apply to ore delivered on and after July 26, 1952. They are Mesabi Range non-bessemer, $9.05; Mesabi Range bessemer, $9.20; old range non-bessemer, $9.30; old range bessemer, $9.45; high phosphorous, $9.05.

The *Foundation Company* of New York has ledged the 15 by 21 foot *Cannon* mine shaft of the *Hanna Coal & Ore Company* at 143 feet below the surface. The Foundation Company completed its work about October 1. The shaft was sunk under compressed air pressure with crews working in 45-minute relays. Shaft sinking began last winter.

The *Allis-Chalmers Manufacturing Company* will build a giant crusher for the *Reserve Mining Company's* taconite plant near Beaver Bay, Minnesota. The crusher will be designed to handle 3,500 tons of taconite per hour; will weigh about 550 tons; will have a 5-foot receiving opening; a 9-foot, 1-inch-maximum-diameter crushing cone, and a 27-foot-long, 100-ton main shaft whose maximum diameter will be 4¾ feet. The crusher will be driven by two 500-hp. motors and will require more than two years to build.

The *Isle Royal Copper Company*, which began in 1852 and closed down after World War II, is cleaning up the last scrap iron from its property near Houghton, Michigan, and is now liquidating the company.

After having spent nine years dredging the tailings from No. 1 bank in Torch Lake, Michigan, the *Quincy Mining Company* will soon move the dredge to No. 2 bank, because the No. 1 bank is nearly exhausted. From the new location, the tailings must be pumped about 1.1 miles to the reclamation plant. The No. 2 bank tailings were deposited in the lake from 1901 to 1920 and are expected to last about five years.

The *U.S Steel Company's Pittsburgh Steamship Division* set an all-time record when its 64 vessels loaded a total of 1,002,092 gross tons of ore in a one-week period, the first 1,000,000-ton week in the half century history of the Pittsburgh fleet. This was the last weekly period of the 1952 shipping season in which lake ships were permitted to load to maximum draft. The fleet recently set a new all-time record for a month's loading with a total of 3,974,477 gross tons during August.

Work on *Reserve Mining Company's* Beaver Bay, Minnesota, taconite development is progressing. The breakwater is rapidly taking shape, built with rock from the shoreline and a short truck haul. Offices and barracks to house construction workers are being erected, as are buildings for the power plant, workshops, and warehouse. Fifty houses have been moved in from Crystal Bay and are being made ready for employee occupation.

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TITANIUM RESEARCH PLANT SEEKS LOWER COST COMMERCIAL PROCESS

A new development section of the titanium research program being undertaken by the U. S. Bureau of Mines has started operations at Boulder City, Nevada. The section, under the direction of M. G. Mastin, will operate a large-scale production and demonstration plant to supplement the laboratory and smaller-scale work of the titanium research section. The expanded scope of the work is in cooperation with the Armed Services.

Equipment in the new plant includes storage and a purification plant for titanium tetrachloride, a group of conventional batch reactors with accessory equipment for producing, purifying, and handling crude titanium sponge metal, and space for a number of new reactors which are in the experimental development stage.

The Bureau first began laboratory experimental work on titanium at Tucson, Arizona, in 1938. All possible methods were evaluated and it was concluded that a process originally suggested by Wilhelm Kroll offered the best possibilities for further development. The basis of the Kroll process is the reduction of titanium tetrachloride with magnesium in an inert atmosphere, usually helium.

In 1942, the titanium project was moved to the Salt Lake City laboratories of the Bureau, and the technique of production was developed and improved by steps until, by 1944, batches of metal weighing 15 pounds could be produced.

In 1944, the project was moved to Boulder City because this station was equipped for development work on a large scale. Here, major emphasis was placed on regular production of a ductile metal of uniform grade, principally for providing samples to enable industry, educational institutions, and research organizations to study the properties and probable usefulness of the metal. Soon the plant turned out 100-pound batches of metal and produced regularly 150 pounds of processed metal weekly. By 1947 the size of the reactor had been increased to produce 200 pounds of metal per week; by 1949, production in the plant had risen to 800 pounds per week.

Late in 1950, the Bureau's pilot plant facilities were loaned to Titanium Metals Corporation to operate as a producing plant. This arrangement continued for over a year and resulted in the production of over 100,000 pounds of metal badly needed for the defense program. Subsequently, Titanium Metals started production in its own plant at Henderson, Nevada.

In spite of extensive research programs sponsored by private and government agencies over the past five years, the Kroll process is still the only commercial one for producing material that can be processed to massive, ductile metal. Sponge titanium metal is quoted at $5.00 per pound, and fabricated materials, such as thin rolled sheets, bring as much as $15.00 per pound. Efforts are constantly being directed by the Bureau toward reducing the cost of producing and fabricating titanium. Experiments performed in the research section that look promising or hopeful will be continued on a larger scale in the new development section, where their potentialities and processing cost can be appraised on a scale of from 400 to 2,000 pounds of metal per day. The metal produced in this plant will go elsewhere for further testing in its fabrication and application.

Anaconda Makes Progress At Yerington Project

The Anaconda Copper Mining Company is stripping 40,000 tons of overburden per day from its Yerington orebody, according to A. J. Gould, plant superintendent. Three, 5-yard electric shovels and a fleet of 25-ton, Diesel-powered trucks are used in the new pit. Mineralized, but below-ore-grade, overburden is being stockpiled separately for possible heap leaching at a future date. Waste from the pit area is trucked to the waste dump area adjacent to the pit.

Pouring of concrete for the new crushing and metallurgical plant started in July. Production of copper precipitate from the new project is scheduled for late in 1953, and will be at an annual rate of 60,000,000 pounds for the first two years of production and 66,000,000 pounds annually thereafter.

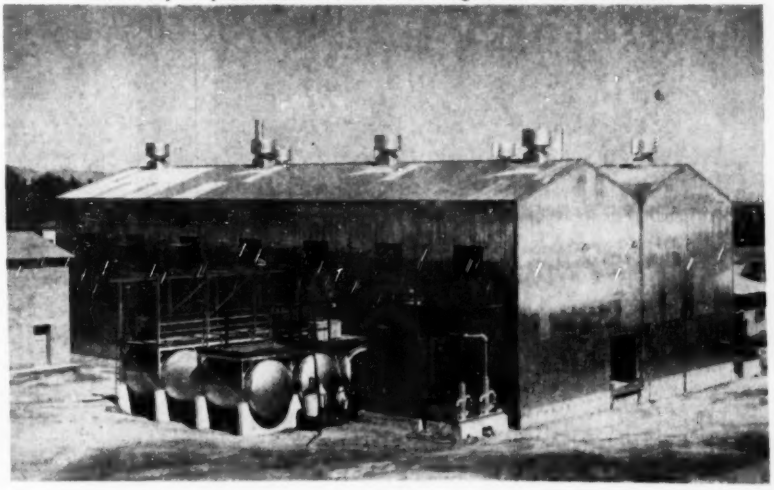
The Isbell Construction Company has been awarded the contract for the 12 miles of access road to be built from U.S. Highway 395 to the Leviathan sulphur mine in Alpine County, California. The sulphur property is a distance of about 60 miles by road from Yerington. Isbell has also been awarded the stripping contract and has commenced stripping of overburden from the sulphur deposit which will be mined by open-pit methods. The 30-percent sulphur ore will be trucked to Yerington and burned in fluosolid reactors to form SO_2 gas used in a contact sulphuric acid plant. The acid will be used to leach the oxide copper minerals in the ore.

Wiechmann and Probasco, Inc. of Reno, have completed the 235 one-, two-, and three-bedroom houses that the company had built to rent mine workers in Nevada's newest community—Weed Heights. In addition, 16 dormitories and a mess hall have been finished to accommodate 100 single men at the project, and construction of recreation facilities is underway. More than half of the new homes are occupied.

ARIZONA

The *Reorganized Silver King Divide Mining Company* is dewatering the 600-foot, or bottom, level of its *Mount Union* mine, near Prescott, Arizona. In the past year and a half, the company has driven a 1,200-foot tunnel which cut the old shaft at the 515-foot level and permitted the draining of old workings. Two ore shoots, 80 to 100 feet in length and 2.0 to 4.0 feet wide, have been opened on the 400 and 500 levels. Plans are now being made for erection of a 50-ton mill for treatment of the lead-zinc-gold-silver ore. H. R. Bissell of Prescott, is manager of the company. At the annual meeting of stockholders in September, the name of the firm was changed to *Mt. Union Mines Inc.*

The newly completed titanium research building of U.S. Bureau of Mines.



Exploration work at the *Morning Star* tungsten mine, in the Old Hat mining district, near Oracle, Arizona, has been started by the *Nikas Mining Company*. A crew of 10 men is already employed in the preliminary work. According to John Gekas, director of the company, the Defense Minerals Exploration Administration has granted the company a $60,000 exploration loan for the project. The Nikas group leased the Morning Star a year ago from Mrs. Elizabeth Woods. Some test mining was done and the ore hauled to the Goldfield mill near Apache Junction, the resulting concentrates being sold to *U. S. Vanadium Company* at Bishop, California. Mining was from tunnels and open cuts, and the ore vein was said to run from 5 to 18 feet in width. Harry E. Krumlauf of Tucson is consulting engineer.

The *Globe-Maimi Copper Zinc Corporation* has purchased the assets of the *Comstock Extension Mining Company, Inc.* of Globe, Arizona. Comstock holdings included the old *Irene* and *Doughboy* properties, both of which have been developed extensively during their 50-year history. It is reported that under terms of the contract of sale more than $500,000 is to be made available for complete development of the property. Officers of purchasing company include James U. Fagan, president, Phoenix; and Russell A. Wright, secretary-treasurer, New York City. Tony Trojanovich, one of the former owners, will serve as mine manager. The sale was handled by the *Bonded Realty Company* of Phoenix, mining brokers.

The *Dutch Flat* group of mines near Yucca, Arizona have been purchased by Birt J. Jackson and Ducan Vaal'duean of Yucca. They are now overhauling the water system and building roads. Installation of a small Straub mill is planned for the future as a pilot mill. First work will be on the tungsten deposits.

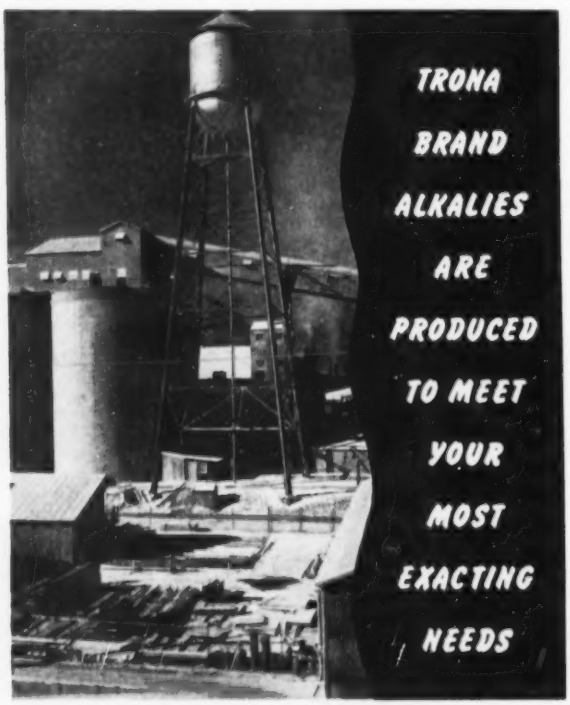
The Defense Materials Procurement Administration has opened a depot at Wenden, Arizona for the buying and stockpiling of manganese ore. A small sampling mill is part of the installation. Government specifications call for ore with a maximum copper-lead-zinc content of 1.0 percent, of which not more than 0.25 may be copper. Ores with a higher lead and zinc content will be accepted if such ores can be nodulized and upgraded to meet these specifications. Producers have until August 31, 1953 to apply for permission to deliver ore to the depot. The program continues until June 30, 1956, unless ore containing 6,000,000 long-ton units of manganese is purchased sooner.

A new, four-year $4,000 scholarship has been established by *Inspiration Consolidated Copper Company* of Inspiration, Arizona. Eligibility for the scholarship is limited to graduates of Globe and Miami (Arizona) high schools, with preference given to candidates who are sons or daughters of employes of Inspiration. According to P. D. I. Honeyman, vice-president and general manager of Inspiration, the new scholarship will be an annual award. The $4,000 will be made available in annual stipends of $1,000 each, to an incoming freshman in the college of engineering or the college of mines, University of Arizona. The $1,000 stipend is renewable during each of the next three years of the student's academic career, upon maintenance of a satisfactory scholastic standing. The initial award went to Edward W. Hinderberger, Jr., 17, a graduate of the Globe high school and who entered the university this year as a freshman.

About 1,000 feet of development work has been done during the past year at the *Catoctin* mine, 12 miles south of Prescott, Arizona, the work consisting of tunnel, crosscuts, and drifts. This work is to be continued in an effort to prove sufficient ore to justify mill construction. C. W. Gabrielson of Prescott, Arizona, is general manager.

The *Holmestake Mining Company* of Winterhaven, California, is operating the *Cargo Muchacho* group of claims in Imperial County, California. Recent developments in the mine have indicated commercial deposits of tungsten and the company is hoping to revamp its mill for treatment of tungsten ores. The Cargo Muchacho, originally operated as a gold producer, is equipped with a 100-ton cyanide mill. Kenneth Holmes is president and manager of the company.

A large strike of exfoliating vermiculite has been found near Jacumba, in San Diego County, California, by Kenneth J. Hines. A bulldozer is reported to have proven the deposit to be large. At the present time, trenching or crosscutting is taking place. So far as can be determined, the main deposit striking northwest and



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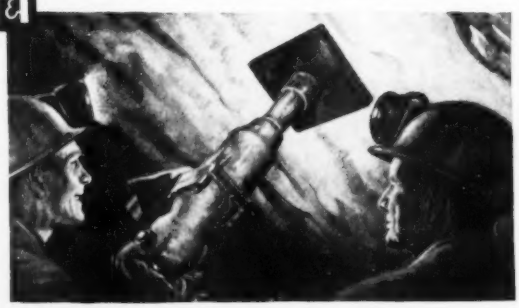

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southeasterly is over 100 feet in width, with a paralleling deposit of unknown width. All road work has been completed and the mill is being refurbished.

The *E. J. Longyear Company* is studying the mineral deposits at the *Bully Hill* mine located on the Squaw Creek arm of Shasta Lake in northern California. The property which has been inactive for the last 25 years, is now owned by the *Glidden Company*. Diamond drilling started last December on a series of 1,000-foot holes. The crew is working on a 24-hour basis to drill 35 such holes on the property. Only about five have been completed to date. The property is a former gold, copper, and zinc producer.

The *Alaska* gold mine located in Sierra County, California, near Pike City, has closed down and equipment is now being dismantled.

The *Minona Mining Company* is operating a dragline dredge on a 1,300 acre tract said to contain 1,600 feet of a gold-bearing channel at the old *Esperance* mine near French Corral, California. The property is estimated to contain about 20,000,000 cubic yards of gravel, free from lava overburden and surface material which were removed years ago by hydraulic mining.

The *Hazel Creek Gold Mining Company* is considering sinking a shaft and conducting extensive deep exploration and development work at its *Hazel Creek* mine in El Dorado County, California. Mining is presently conducted through a 500-foot tunnel which has developed the ore body to a depth of about 250 feet. The mill has a 25-ton-per-day capacity, producing a lead-gold concentrate which is shipped to the *American Smelting and Refining Company's* smelter at Selby, California.

A ball mill has been added to the reduction plant of *Sarita Milling Company* at its *Sarita* gold mine in the Masonic district of Mono County, California. The company also operates the *Chemung*, the *Pittsburgh-Liberty* and other gold properties in the county. The Sarita is said to contain about 100,000 tons of ore, mined from an open pit.

A commercial sulphur deposit reportedly has been discovered near Beowawe, Nevada. Oscar J. Streeter and Pete Peterson of Elko are said to have uncovered about 400 tons of sulphur with indications that the deposit contains about 100,000 tons. They also have moved power loaders and a bulldozer to the *Summit View* mine in Corral Canyon, south of Harrison Pass. They expect to ship silver and lead from there soon.

The *Riley* mine, closed since December 1947, has been reopened and is producing tungsten again. *U. S. Vanadium Company* is owner of the property which is located in the Potosi district about 42 miles northeast of Winnemucca, Nevada. John Etchart has a contract with U. S. Vanadium to mine and haul the ore to the mill of *Getchell Mine, Inc.*, where it will be custom-milled. The concentrate will then be shipped to U. S. Vanadium's synthetic scheelite plant near Bishop, California for processing.

Manganese, Inc.'s new 1,200-ton mill at the *Three Kids* mine near Henderson, Nevada, is now in production and is processing a 280,000-ton stockpile of 22 percent manganese dioxide ore. The stockpile was built during World War II for the *Metals Reserve Company*. The manganese dioxide is crushed, concentrated by flotation, calcined in huge kilns, and nodulized to a metallurgical grade of 45 percent manganese or better. The product is shipped to various destinations as ordered by the General Services Administration.

Kaiser Aluminum & Chemical Corporation's new fluorspar flotation mill has been completed near Fallon, Nevada. The mill will process about 100 tons of ore daily, from which about 30 to 50 tons of concentrates will be produced. The concentrates will be shipped by rail to Nichols, California for further treatment. Fluorspar will come from the *Baxter* mine near Gabbs, which was purchased several months ago. Preparatory work has been going on in the mine and it is now ready for production.

The *Consolidated Eureka Mining Company* operating at Eureka, Nevada is extending its Diamond tunnel 100 feet to the west to cut a station from which diamond drilling may be carried on. The property produced substantial lead-silver tonnages in earlier operations.

Foley Brothers, Incorporated has resumed normal sinking of the Deep Ruth Shaft at Kimberley, Nevada. Sinking of the 1,600-foot-deep shaft has been slow and difficult due to the sudden and unex-

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pected inflows of water. In one instance, 15,000 gallons per minute flooded the shaft necessitating the placing of a concrete seal under 200 feet of water. Roy Hickman is job manager for Foley Brothers who are sinking the shaft, driving 9,000 feet of main haulageway, and 16,000 feet of ore transfer raises for the Nevada Mines Division of *Kennecott Copper Corporation.*

The Defense Materials Procurement Agency has authorized a field investigation of the tungsten potential in the Ely, Nevada region. The survey will be made by government geologists and mining engineers. Some promising scheelite deposits have been found in this area.

A shaft being sunk by the *Alpine Mining Company* at its *Noonday* mine in Nevada is down 75 feet and nearing its initial objective. At the 100-foot point, it is planned to open stopes for mining of shipping-grade, lead-zinc-silver ore. Progress is slow because of the fractured rock formation. The two-compartment, 9 by 6 foot shaft is being sunk at the rate of two feet a day. Construction of a flotation plant is planned for the future.

Development work reportedly is going ahead steadily at the *Ward* mine in White Pine County, Nevada. Located some 17 miles south of Ely, the property is being operated through a joint agreement by *Buffalo Consolidated Mining Company, Golden Centuries Industries, Inc.*, and the *Walker Corporation.* Work is in the Mountain Pride tunnel and the Lower Defiance tunnel, each driving toward a different ore body. Two carloads of ore have been shipped with values in gold, silver, copper, and lead. The new operators have done much rehabilitation work, including road building, cleaning out of old workings, and installation of new machinery. "Bud" Walker of Ely is in charge.

The *New World Exploration, Research and Development Corporation* is now operating the *Alladin* mine near Elko, Nevada, shipping about one carload a day of high-grade lead-silver-copper ore to the *American Smelting and Refining Company's* lead smelter at Selby, California. Diamond drilling is under way to block out additional tonnages for future shipment. The corporation is also engaged in exploration of a tungsten deposit at Bullion, Nevada, in Elko County. They are presently driving an exploration raise to determine the extent of a medium-grade ore body. Negotiations have just been completed by the corporation for a lease on the Ruby Valley barite deposit of Moore and Griffith. A geological examination has been completed and a diamond drilling crew is now drilling the area to determine grade and tonnage.

The *Fowler Mining Company* has been organized and incorporated in Carson City, Nevada, with a capitalization of $100,000. Earl S. Fowler is president; Howard Molini, vice president; Alice M. Fowler, secretary; John Molini, treasurer; Arlie Roy Eubanks, second vice president; and Earl Lee Eubanks, director. The firm is working a property located near the Esmeralda County-California line. Showings are in lead and silver ore.

The most powerful copper mine hoist in the United States is being built by the General Electric Company at Schenectady, New York for a block-caving mine operation at *Kennecott Copper Company's Deep Ruth* mine in Nevada. Two 660-volt d-c motors, with a combined rating of 3,300 hp. at 500 rpm, comprise the drive which will power the hoist. The hoist itself, being built by the Nordberg

(*Continued on page* 100)

Statement of Ownership

Statement of the ownership, management, and circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233), of Mining World, published monthly; semi-monthly in April, at Bristol, Connecticut, for October 1, 1952.

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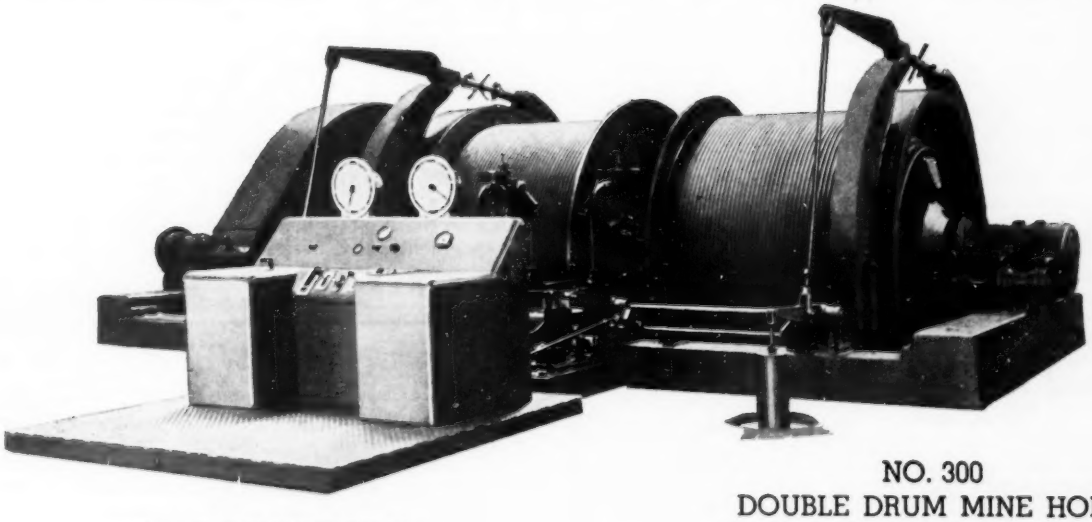
VULCAN-DENVER



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VULCAN DENVER 1891

VULCAN - DENVER HOISTS
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VULCAN DENVER 1891

(*Continued from page 50*)

bedsteads and with a big iron range in the kitchen. While some of the buildings were fairly new (for the mine was working about 15 years ago), others dated from 1900 and still others from the 1890's when the vein was first opened and when eight burro-loads of ore were taken from it over to Utah to be smelted. This mine is just below timberline. Above it, on the bare rock slopes, studded with patches of old snow, are the dumps of the Good Hope and the Yankakee, the Gold Bug and the Silver Bug.

Beartown was flourishing in 1894 and for several years thereafter. Old prospectors who staked claims in 1893 and had gone out for the winter started early to outfit for the new season. Both A. L. Miller, the proprietor of the stage line between Bachelor and Creede, and Ridenour and Shelhomer, who ran a line of vehicles from Spar City to Creede, prepared to put on stages to the new camp high in the San Juans.

The impatient miners who had gone out for the winter, and others who were arriving for the first time in the spring of 1894, were eager to get to the camp as soon as possible. Although snow lay deep on the trail for miles below the place, they broke trail as far as they could, and then, rather than wait for the snow to melt in Gold Run Park, as Beartown was also called, these early comers laid out a new townsite where the Rio Grande, Bear and Pole Creeks join and called their camp Junction City.

By the middle of April, the new town contained 40 cabins with stores and saloons open for business. The *Candle* of April 27 described the place as "five miles from the mines in a pretty park, level and affording ample room for town building. . . . Junction City is the outcome of the rush which started from Creede, Bachelor, and Salida early last week. . . . A meeting of the settlers was held and it was decided that all prospectors and their grubstakers should have first choice of lots and be entitled each to one business and one residence lot."

After exploring the site of Beartown in 1948, and scrambling up to the shaft holes and snow-warped sheds which mark its once-rich mines, I rode back five miles down Bear Creek valley, looking for any remaining traces of Junction City. All I found was one old weathered and decrepit cabin.

After reclimbing Timber Hill, I looked to the west, across the high open country, to Stony Pass, a saddle south of a bare, rocky peak. Over its grim ribs, a tidal wave of miners swept into the rich mineral country which had been torn from the Indians as soon as Felix Brunot had negotiated a treaty with the Utes in 1873.

Nothing but the craze for gold could have kept the stream of miners clambering over range after range without roads or trails other than those made by Indians or worn by wild animals. Even when trails were blazed by the impetuous men, they were almost impassable; the first roads constructed were little better. During the 1870's the gateway to the San Juan area was over Stony Pass, 12,090 feet above sea level. From Del Norte, men followed the Rio Grande valley, past Antelope Park, to the headwaters of the river, and crawled over Stony Pass and down Rocky Gulch on the other side to Baker Park. Until a wagon road was built in 1879, people left their wagons in a park above Wagon Wheel Gap on the Rio Grande, packed their equipment on burros, and fought their way up over the pass and down Cunningham Gulch to Silverton.

For years W. D. Watson ran a "roadhouse and stopping place for man and beast" at the foot of Grassy Hill on the east side of Stony Pass. All summer hundreds of pack animals were turned out to graze on the green slopes before sundown, while the weary miners and freighters rolled up in their blankets for a night's rest before tackling the difficult climb over the range.

In June 1877 the citizens of Silverton "turned out in force" to open the road to Antelope Park. "While working in old snow, 12 feet deep, two snowstorms occurred, depositing 16 more inches of the beautiful" and materially hampering their work.

Even when the road was built, it was rough and difficult. It crossed the pass 500 feet higher than the trail and the descent to Howardsville on the far side was steeper than the eastern face, dropping 2,300 feet in the first two miles down Rocky Gulch. Yet over this pass the prospectors and settlers went in and the pack trains of ore went out. In winter it was closed except for such pieces of mail as could be packed over it on the back of a carrier on snowshoes.

The year the road over the pass was opened, Silverton, with its many frame cabins and flimsy tents, decided that it needed fire protection and ordered a "hook and ladder truck with necessary equipment" sent to the isolated mountain town. The truck was delivered at Grassy Hill where it was met by nearly half the male population of Silverton and hauled by hand over the summit of the pass and down into town. It was preceded on the last leg of the journey by the Silverton Cornet Band, and in the evening a big dance was given in its honor.

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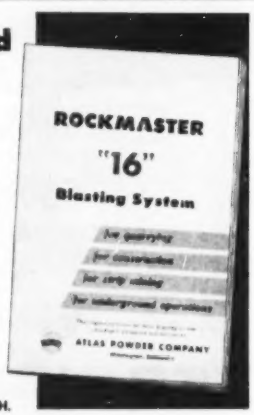

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Southwest News

(Continued from page 97)

Manufacturing Company, will hoist two skips arranged in balance and weighing 21,000 pounds each. When operating from the maximum depth, the hoist will be capable of delivering 12 tons of copper ore to the surface every 72 seconds. GE is also building a 600-hp. drive for a Nordberg man-and-materials hoist at the same mine. This drive will be powerful enough to raise a double-decked cage at a rate of 1,200 feet per minute.

NEW MEXICO

Howard I. Young, assistant administrator of the Defense Materials Procurement Agency, will be one of the principal speakers at the Southwest Mineral Conference to be held in Albuquerque, New Mexico, November 6, 7, and 8. He will report on defense minerals activities. The conference is sponsored by the New Mexico Mining Association and the Southwest International Mining Association.

The *Kennecott Copper Corporation* has closed two of its lead-zinc mines in Grant County, New Mexico because of the recent drop in the price of zinc. The Oswaldo No. 1 and No. 2 shafts near Santa Rita were closed because the present 13½-cent-per-pound price for zinc makes operations unprofitable. About 160 men will be affected but according to William H. Goodrich, general manager of Kennecott's *Chino Mines Division*, none of the men will be laid off. Skeleton crews will be maintained, and the other employes will be moved to Kennecott's huge *Santa Rita* open-pit copper mine which is producing at capacity. No other major zinc producer in Grant County has reported plans to curtail operations.

New Mexico's mining industry in the fiscal year that ended June 30 broke all previous records. State mine inspector John Garcia's annnal report shows minerals valued at $99,648,584 were produced—an increase of $9,926,628 over the previous year, the last record made. Although there was a decrease of 1,253 tons as compared with the previous year, copper production again led the metallics, reporting a volume of 73,954 refined tons valued at $35,767,417. The decrease is attributed to a two-week work stoppage in February which affected major producers in Grant County. Provided the present demand for copper continues, the price remains at the present level, and no work stoppages occur, copper production should be in the neighborhood of 75,000 tons for the present fiscal year.

The Defense Minerals Exploration Administration has approved a $20,000 contract for the *Black Hawk Construction Mines Company* of Silver City, New Mexico to explore for cobalt-uranium in Grant County, New Mexico.

The *Portales* mine and the open-pit *Malachite-Julian* mine of the *Mex-Tex Mining Company* each have been trucking about 150 tons of ore daily recently from Hansonberg mining district of New Mexico to their respective mills in San Antonio, New Mexico. The Portales mill produces galena, the Mex-Tex mill barite, galena, and fluorite.

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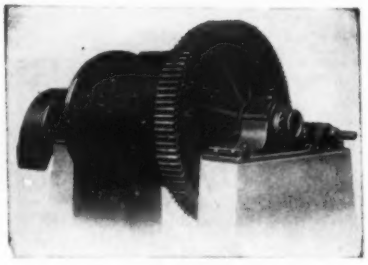

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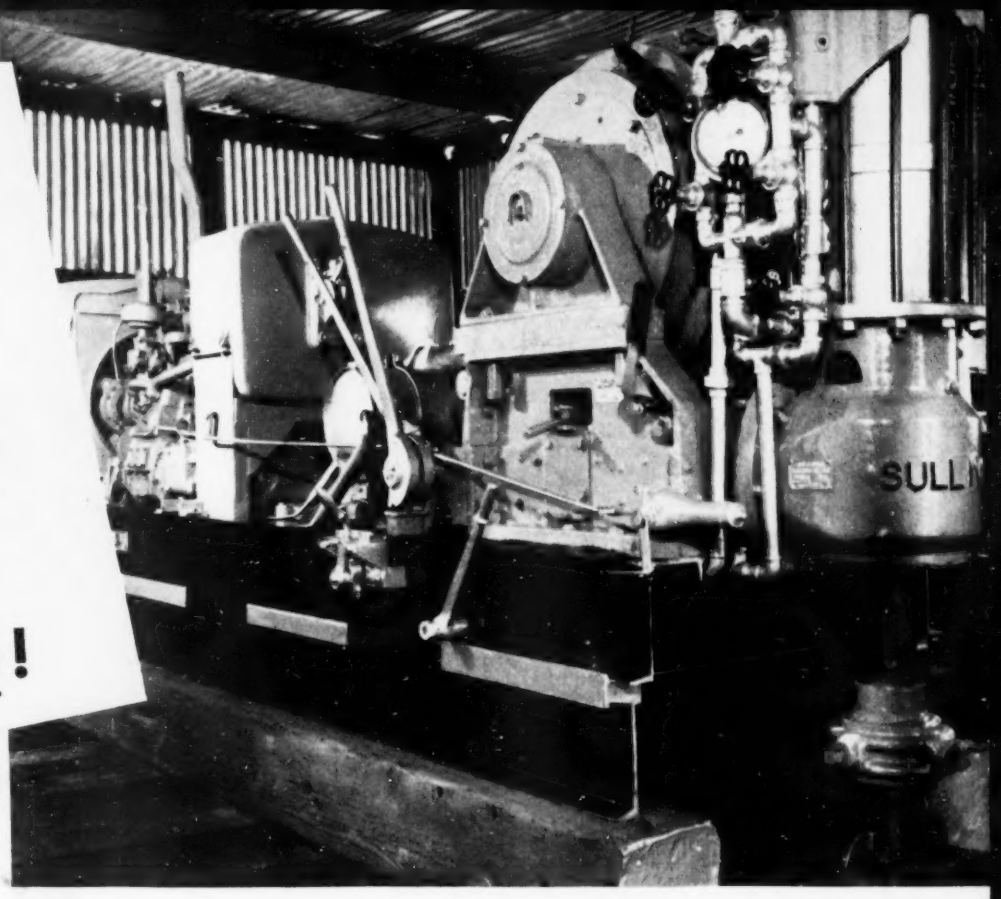

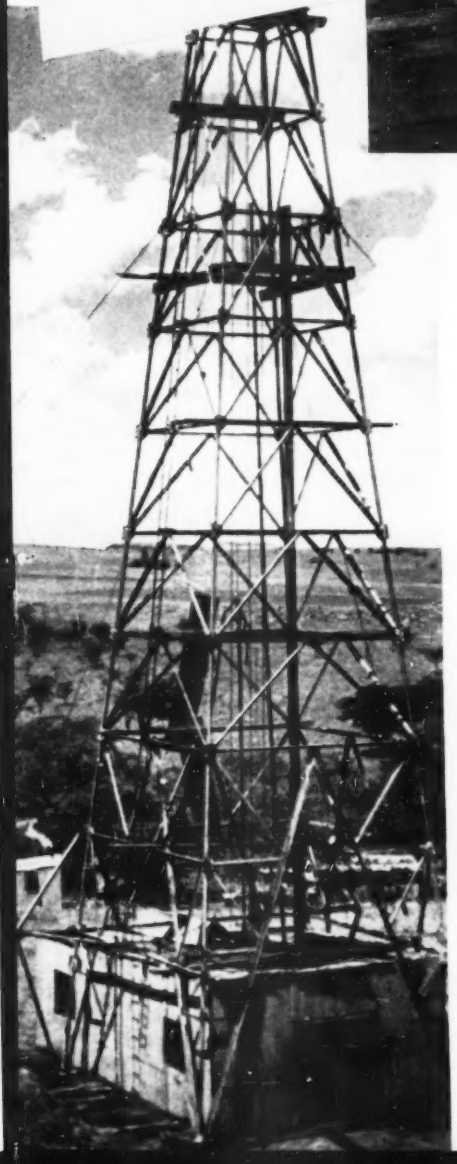

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During its long life, new pistons and liners have been installed three times. Other repairs include new fuel pumps and injection valves and one new set of connecting rod bearings. The total cost of repairs and labor has averaged less than 1½ cents per work hour.

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The Diamond Drilling Co. has continued to replace steam-driven rigs with "Caterpillar" power and now has 17 "Cat" Engines at work. T. B. Haines, District Foreman, says the firm has gone 100% "Caterpillar" because of low maintenance cost, reduced labor costs, and savings in the costs of fuel.

Those same reasons hold good wherever mining operations call for dependable power. Your "Caterpillar" Dealer can give you many additional facts about these sturdy engines for your mining jobs. See him today.

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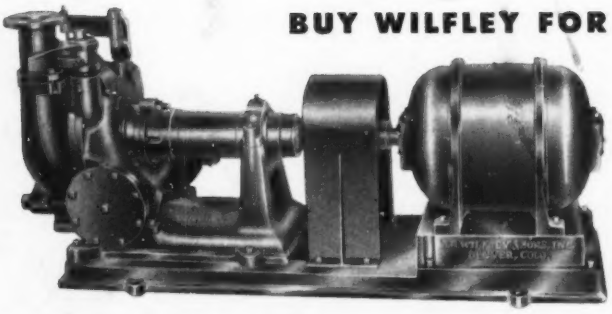

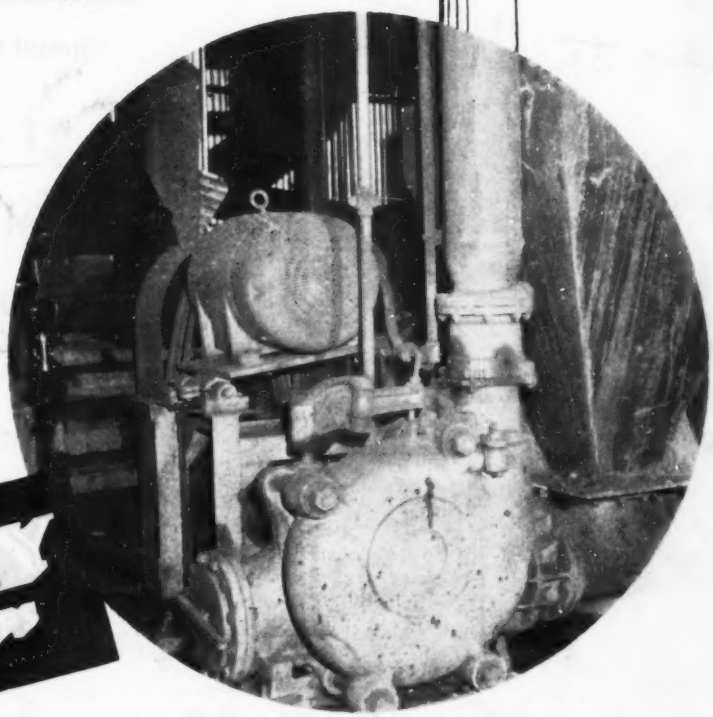

This Wilfley Model K *pump is extremely effective in heavy media circuit and thickener circuit work in coal washing operations. Specifically designed for rugged, heavy duty performance, delivering continuous, trouble-free operation at low cost without media loss, leakage or dilution.*

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